



BIDDING DOCUMENTS

For

***Hiring of Services for construction of PSPC Main Gate (N1)
along with reception building; allied road works, civil
works, MEP works and Supply & Installation of Security
Equipment***

(Single Stage Two Envelope Procedure)

Quality and Cost Based Selection Method

Note:

1. Make/Brand wherever appears in tender document should be read in conjunction with the word "Equivalent".
2. Bidders must visit the site to physically access the scope of work.
3. Provision of clear details and specifications of material to be used is mandatory.
4. Bids with non-compliance of above-mentioned conditions shall be rejected then & there.
5. In case of any contradiction in BOQ and Tender document, the BOQ will be considered as the primary document and it will be prevailed.
6. Sign & Stamp on all pages dully filled by bidder.
7. The earnest money of un-successful bidders will be returned after 5 days of posting of Final Evaluation Report on EPADS and PPRA.

Purchase Department, Pakistan Security Printing Corporation (Pvt.) Ltd

Jinnah Avenue, Malir Halt, Karachi-Pakistan,

Phone: (92-21)-99248511-15, Facsimile : (92-21)-99248534

Email: purchase.local@pspc.gov.pk Website: www.pspc.gov.pk

Preface

Rule 23 of Public Procurement Rules requires procuring agencies to formulate bidding documents that shall be made available to the bidders immediately after the publication of the invitation to bid.

Document comprises of the Sections listed below:

PART-A – BIDDING PROCEDURE & REQUIREMENTS

Section I	Invitation to Bids
Section II	Instructions to Bidders (ITB)
Section III	Bid Data Sheet (BDS)
Section IV	Eligible Countries
Section V	Technical Specifications, Schedule of Requirements
Section VI	Standard Forms

PART-B – CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section VII	General Conditions of Contract (GCC)
Section VIII	Special Conditions of Contract (SCC)
Section IX	Contract Forms
	Integrity Pact

Bidding Documents for Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment

PART-A – BIDDING PROCEDURE & REQUIREMENTS

Section I - Invitation to Bids

Section II- Instructions to Bidders (ITB)

This Section provides information to help Bidders prepare their Bids. Information is provided for the submission, opening, and evaluation of Bids and for the award of Contract.

Section III- Bid Data Sheet (BDS)

This Section includes provisions specific to procurement and to supplement Section-II, Instructions to Bidders.

Section IV - Eligible Countries

This Section contains information regarding eligible countries.

Section V - Technical Specifications, Schedule of Requirements

This Section includes the details of specifications for the goods and ancillary services to be procured and schedule of requirements.

Section VI - Standard Forms

This Section includes the standard forms for the Bid Submission, Price Schedules, and Bid Security etc. These forms are to be completed and submitted by the Bidder as part of Bid.

PART-B – CONDITIONS OF CONTRACT AND CONTRACT FORMS

Section VII - General Conditions of Contract (GCC)

This Section includes the general clauses to be applied in all the contracts.

Section VIII - Special Conditions of Contract (SCC)

This Section consists of Contract Specific general and special conditions.

Section IX - Contract Forms

This Section contains forms which, once completed, will become part of the Contract. The forms for

Performance Security will be submitted by the successful bidder to whom Purchase Order is issued, before the award of contract.

Integrity Pact

The successful bidder shall be required to furnish Integrity Pact as per the attached format.

Checklist for Tender “Single Stage Two Envelope”

To ensure following condition should be complied before submitting the tender documents in PSPC.

		YES	NO
01.	Complete tender documents have been read thoroughly and understood.		
02.	Complete tender documents duly filled in and each page signed and stamped.		
03.	Submitted through EPADS Technical and Financial bid.		
04.	Financial element not mentioned in technical document.		
05.	Bid security Rs. 4,000,000/- fixed uploaded through EPADS and submitted to PSPC's provided address before the bid opening time.		
06.	Provision of sample. (Not Applicable)		
07.	Period of Bid validity is 120 days from bid opening date.		
08.	Delivery schedule and payment terms are agreed.		

PART-A

BIDDING PROCEDURE & REQUIREMENTS

SECTION I: INVITATION TO BIDS



Pakistan Security Printing Corporation (Pvt.) Ltd

INVITATION TO BIDS

Invitation No. LP/T-4110/26/FA

Date: April 23, 2026

- a) This Invitation to Bids follows the Procurement Advertisement (PA) No. LP/T-4110/26/FA for the procurement of ***Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment.***
- b) The Pakistan Security Printing Corporation (Pvt.) Ltd (PSPC) has reserved the funds for the procurement planned during the financial year 2025-26. It is intended that part of the proceeds of the fund will be used to cover eligible payment under the contract for the procurement.
- c) PSPC now invites sealed bids from eligible Manufacturer / Suppliers to acquire ***Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment*** that meet the following eligibility criteria:
- i. This invitation for Bids is open to all reputed Firms/manufactures/ suppliers / contractors.
 - ii. Bidders should not be under a declaration of ineligibility for corrupt and fraudulent practices issued by any Government (Federal, Provincial), a local body and international or a public sector organization.
 - iii. The bidder must possess minimum ten (10) years of relevant construction experience in similar nature projects.
 - iv. Valid PEC Registration - Category C-3 or Above.
 - v. Affidavit of Non-Blacklisting and Litigation Disclosure.
 - vi. Signed Acceptance of BOQ, Drawings, and Tender Conditions by the bidder.
 - vii. Submission of Valid Project-Specific OEM Authorization Certificate for all quoted Security Equipment.
 - viii. Submission of Complete Technical Submittals and Data Sheets.
 - ix. Mandatory Pre-Bid Meeting Attendance.
 - x. Mandatory Site Visit verified through PSPC Entry Approval Log.
 - xi. Audited Financial Statements (Last 3 Years) and should be submitted along with the technical bid
 - xii. They must be registered with tax authorities and are active tax payers.
 - xiii. The bidder and their deputed staff must submit an undertaking to comply with PSPC's Code of Conduct, using the prescribed format provided in the tender document.
 - xiv. The bidder must submit an undertaking to comply with all applicable HSE laws, regulations and industry standards; and with all HSE requirements of PSPC, using the prescribed format provided in the tender document.
 - xv. Any regular employee, contractual, or outsourced/third-party resource who are currently or were previously deputed on PSPC assignments during last 5 years are not authorized to participate in the bidding process for next 2 years either as a bidder or as a representative of any bidder/vendor. PSPC reserves the right to reject such bids at any stage of the procurement process.
 - xvi. Submission of NDA as per the prescribed format

xvii. **Scoring of ≥ 49 Marks** in Technical Evaluation Criteria defined in clause 35 of BDS.

The bidders do not fulfill any of the above mandatory requirements shall not be considered for detailed evaluation and hence disqualified for further evaluation.

- d) The bidding shall be conducted in line with the Single Stage Two Envelope Procedure of the Public Procurement Rules 2004 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority (from time to time) and is open to all potential bidders.
- e) All bids must be accompanied by a Bid Security in an acceptable form. The amount of Bid Security shall be **Rs. 4,000,000/-** fixed. The scanned copy of Bid security is to be submitted through EPADS and Bid security in original is to be dispatched to PSPC and same must reach before bid submission deadline. Non-submission of Bid security before bid submission deadline will lead to rejection of bid then & there.
- f) Tender advertisement can be viewed on the newspaper, PPRA and PSPC websites (www.ppra.org.pk and www.pspc.gov.pk), whereas the complete tender document containing a detailed description of the assignment and other terms and conditions is available on EPADS at www.eprocure.gov.pk.
- g) Electronic bids prepared in accordance with the instruction provided in tender document must be submitted by using EPADS on or before **May 21, 2026 11:00 A.M.** Manual bids will not be accepted. The e-bids will be opened on the given date and time by using EPADS at **11:30 A.M.** in the presence of the bidder(s), who desire to attend. Conditional / incomplete bid document will not be considered.
- h) Pre-Bid meeting will be held both in person/physical and via Zoom on Monday, **May 7, 2026, at 10:00 AM** in PSPC Roomi Hall located at Head Office, Pakistan Security Printing Corporation (Pvt.) Ltd., Jinnah Avenue, Malir Halt, Karachi, Pakistan. A Zoom session will be arranged for those who wish to attend virtually.
- i) To participate in the pre-bid meeting, potential bidders are requested to send the following details to furqan.awan@pspc.gov.pk at least one day prior to the meeting for entry permission. A Zoom link will be shared upon request sent to the same email address. a) *Name of Participant* b) *CNIC No.* c) *CNIC Issuance Date* d) *Vehicle No.* e) *Company*

**Deputy General Manager
Purchase Department
Pakistan Security Printing Corporation (Pvt.) Ltd.
Jinnah Avenue Malir Halt, Karachi – 75100
Ph: 021-99248511 (Ext – 2202-19) / www.pspc.gov.pk**

BIDDER DETAILS

1.	BRIEF DESCRIPTION OF GOODS / JOBS & QUANTITY:	
2.	NAME OF BIDDER (Company / Manufacturer / Supplier)	
3.	ADDRESS	
4.	GST NO.	
5.	NTN NO.	
6.	NAME OF AUTHORIZED PERSON	
7.	DESIGNATION	
8.	TELEPHONE	
9.	FAX	
10.	CELL NO.	
11.	EMAIL ADDRESS	
12.	NAME & ADDRESS OF PRINCIPAL, IF ANY	
13.	PHONE NO. OF PRINCIPAL	

BID SUBMITTED BY

Company Seal _____

Signature _____

Name _____

Date _____

Designation _____

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SECTION II: INSTRUCTION TO BIDDERS (ITBs)

Section II. Instructions to Bidders (ITBs)

A. Introduction		
1. Scope of Application	1.1	The Procuring Agency (PA), as indicated in the Bid Data Sheet (BDS) invites Bids for the equipment and related services as specified in the BDS and Section V - Technical Specifications & Schedule of Requirements. The successful Bidders will be expected to supply and install the equipment within the specified period and timeline(s) as stated in the BDS.
2. Sources of Funds	2.1	Source of funds is referred in Clause-2 of Invitation to Bids.
3. Eligible Bidders	3.1	A Bidder may be natural person, company or firm or public or semi-public agency of Pakistan or of any foreign country, or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture, consortium, or association. In the case of a joint venture, consortium, or association, all members shall be jointly and severally liable for the execution of the Contract in accordance with the terms and conditions of the Contract. The joint venture, consortium, or association shall nominate a Lead Member as nominated in the BDS, who shall have the authority to conduct all business for and on behalf of any and all the members of the joint venture, consortium, or association during the Bidding process, and in case of award of contract, during the execution of contract.
	3.2	The appointment of Lead Member in the joint venture, consortium, or association shall be confirmed by submission of a valid Power of Attorney to the Procuring Agency.
	3.3	Verifiable copy of the agreement that forms a joint venture, consortium or association shall be required to be submitted as part of the Bid.
	3.4	Any bid submitted by the joint venture, consortium or association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring Agency and in line with any instructions issued by the Authority.
	3.5	The invitation for Bids is open to all prospective supplier, manufacturers or authorized agents/dealers subject to any provisions of incorporation or licensing by the respective national incorporating agency or statutory body established for that particular trade or business.

	3.6 Foreign Bidders must be locally registered with the appropriate national incorporating body or the statutory body, before participating in the national/international competitive tendering with the exception of such procurements made by the foreign missions of Pakistan. For such purpose the bidder must have to initiate the registration process before the bid submission and the necessary evidence shall be submitted to the procuring agency along with their bid, however, the final award will be subject to the complete registration process. 3.7 A Bidder shall not have a conflict of interest. All Bidders found to have a conflict of interest shall be disqualified. A Bidders may be considered to have a conflict of interest with one or more parties in this Bidding process, if they: a. are associated or have been associated in the past, 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, specifications and other documents to be used for the procurement of goods and related services to be procured under this Invitation for Bids. b. have controlling shareholders in common; or c. receive or have received any direct or indirect subsidy from any of them; or d. have the same legal representative for purposes of this Bid; or e. 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; or f. Submit more than one Bid in this Bidding process. 3.8 A Bidder may be ineligible if – a. he is declared bankrupt or, in the case of company or firm, insolvent; b. payments in favor of the Bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property; c. legal proceedings are instituted against such Bidder involving an order suspending payments and which may result, in accordance with the national laws, in a declaration of bankruptcy or in any other situation

	entailing the total or partial loss of the right to administer and dispose of the property; d. the Bidder is convicted, by a final judgment, of any offence involving professional conduct; e. the Bidder is blacklisted and hence debarred due to involvement in corrupt and fraudulent practices, or performance failure or due to breach of bid securing declaration. f. The firm, supplier and contractor is blacklisted or debarred by a foreign country, international organization, or other foreign institutions for the period defined by them. 3.9 Bidders shall provide to the Procuring Agency evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract effectively. 3.10 Bidders shall provide such evidence of their continued eligibility to the satisfaction of the Procuring Agency, as the Procuring Agency shall reasonably request. 3.11 Bidders shall submit proposals relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract amounting to the more than ten (10) percent of the Bid price is envisaged.
4. Eligible Goods and Related Services	4.1 All the goods and related services to be supplied under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such goods and services. For purpose of this Bid, ineligible countries are stated in the section-4 titled as "Eligible Countries". 4.2 For purposes of this Clause, "origin" means the place where the goods are mined, grown, cultivated, produced, manufactured, or processed, or through manufacture, procession, or assembly, another commercially recognized article results that differs substantially in its basic characteristics from its imported components or the place from where the related services are/to be supplied. 4.3 The nationality of the supplier that supplies and install the goods shall not determine the origin of the goods.

	4.4 To establish the eligibility of the Goods and the related services, Bidders shall fill the country of origin declarations included in the Form of Bid. 4.5 If so required in the BDS, the Bidder shall demonstrate that it has been duly authorized by the manufacturer of the goods to deliver in Pakistan (or in respective country in case of procurement by the Pakistani Missions abroad), the goods indicated in its Bid.
5. One Bid per Bidder	5.1 A bidder shall submit only one Bid, in the same bidding process, either individually as a Bidder or as a member in a joint venture or any similar arrangement. 5.2 No bidder can be a sub-contractor while submitting a Bid individually or as a member of a joint venture in the same Bidding process. 5.3 A person or a firm cannot be a sub-contractor with more than one bidder in the same bidding process.
6. Cost of Bidding	6.1 The Bidder shall bear all costs associated with the preparation and submission of its Bid, and the Procuring Agency shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.
B. Bidding Documents	
7. Contents of Bidding Documents	7.1 The goods required, bidding procedures, and terms and conditions of the contract are prescribed in the Bidding Documents. In addition to the Invitation to Bids, the Bidding Documents which should be read in conjunction with any addenda issued in accordance with ITB 9.2 include: Section I -Invitation to Bids Section II Instructions to Bidders (ITBs) Section III Bid Data Sheet (BDS) Section IV Eligible Countries Section V Schedule of Requirements and Technical Specifications Section VI Standard Forms Section VII General Conditions of Contract (GCC) Section VIII Special Conditions of Contract (SCC) Section IX Contract Forms 7.2 The number of copies to be completed and returned with the Bid is specified in the BDS. 7.3 The Procuring Agency is not responsible for the completeness of the Bidding Documents and their addenda, if they were not obtained directly from the Procuring Agency or the signed pdf

	version from downloaded from the website of the Procuring Agency. However, Procuring Agency shall place both the pdf and same editable version to facilitate the bidder for filling the forms. 7.4 The Bidder is expected to examine all instructions, forms, terms and specifications in the Bidding Documents. Failure to furnish all the information required in the Bidding Documents will be at the Bidder's risk and may result in the rejection of his Bid.
8. Clarification of Bidding Documents	8.1 A prospective Bidder requiring any clarification of the Bidding Documents may notify the Procuring Agency in writing or in electronic form that provides record of the content of communication at the Procuring Agency's address indicated in the BDS. 8.2 The Procuring Agency will within three (3) working days after receiving the request for clarification, respond in writing or in electronic form to any request for clarification provided that such request is received not later than three (03) days prior to the deadline for the submission of Bids as prescribed in ITB 23.1. However, this clause shall not apply in case of alternate methods of Procurement. 8.3 Copies of the Procuring Agency's response will be forwarded to all identified Prospective Bidders through an identified source of communication, including a description of the inquiry, but without identifying its source. In case of downloading of the Bidding Documents from the website of PA, the response of all such queries will also be available on the same link available at the website. 8.4 Should the Procuring Agency deem it necessary to amend the Bidding Documents as a result of a clarification, it shall do so following the procedure under ITB 9. 8.5 If indicated in the BDS, the Bidder's designated representative is invited at the Bidder's cost to attend a pre-Bid meeting at the place, date and time mentioned in the BDS. During this pre-Bid meeting, prospective Bidders may request clarification of the schedule of requirement, the Evaluation Criteria or any other aspects of the Bidding Documents. 8.6 Minutes of the pre-Bid meeting, if applicable, including the text of the questions asked by Bidders, including those during the meeting (without identifying the source) and the responses given, together with any responses prepared after the meeting will be transmitted promptly to all prospective Bidders who have obtained the Bidding Documents. Any modification to the Bidding Documents that may become necessary as a result of the pre-Bid meeting shall be made by the Procuring Agency

		exclusively through the use of an Addendum pursuant to ITB 9 . Non-attendance at the pre-Bid meeting will not be a cause for disqualification of a Bidder.
9. Amendment of Bidding Documents	9.1	Before the deadline for submission of Bids, the Procuring Agency for any reason, whether at its own initiative or in response to a clarification requested by a prospective Bidder or pre-bid meeting may modify the Bidding Documents by issuing addenda.
	9.2	Any addendum issued including the notice of any extension of the deadline shall be part of the Bidding Documents pursuant to ITB 7.1 and shall be communicated in writing or in any identified electronic form that provide record of the content of communication to all the bidders who have obtained the Bidding Documents from the Procuring Agency. The Procuring Agency shall promptly publish the Addendum at the Procuring Agency's web page identified in the BDS:
	9.3	To give prospective Bidders reasonable time in which to take an addendum/corrigendum into account in preparing their Bids, the Procuring Agency may, at its discretion, extend the deadline for the submission of Bids: Provided that the Procuring Agency shall extend the deadline for submission of Bid, if such an addendum is issued within last three (03) days of the Bid submission deadline.
C. Preparation of Bids		
10. Language of Bid	10.1	The Bid prepared by the Bidder, as well as all correspondence and documents relating to the Bid exchanged by the Bidder and the Procuring Agency shall be written in the English language unless otherwise specified in the BDS . Supporting documents and printed literature furnished by the Bidder may be in another language provided they are accompanied by an accurate translation of the relevant pages in the English language unless specified in the BDS , in which case, for purposes of interpretation of the Bidder, the translation shall govern.
11. Documents and Sample(s) Constituting the Bid	11.1	The Bid prepared by the Bidder shall constitute the following components: - a) Form of Bid and Bid Prices completed in accordance with ITB 14 and 15; b) Details of the Sample(s) where applicable and requested in the BDS. c) Documentary evidence established in accordance with ITB 13 that the Bidder is eligible and/or qualified for the subject bidding process; d) Documentary evidence established in accordance with ITB 13.3(a) that the Bidder has been authorized by the manufacturer to deliver the goods into Pakistan, where

	required and where the supplier is not the manufacturer of those goods; e) Documentary evidence established in accordance with ITB 12 that the goods and related services to be supplied by the Bidder are eligible goods and services, and conform to the Bidding Documents; f) Bid security or Bid Securing Declaration furnished in accordance with ITB 18; g) Duly Notarized Power of Attorney authorizing the signatory of the Bidder to submit the bid; and h) Any other document required in the BDS 11.2 Where a sample(s) is required by a procuring agency, the sample shall be: (a) submitted as part of the bid, in the quantities, dimensions and other details requested in the BDS; (b) carriage paid; (c) received on, or before, the closing time and date for the submission of bids; and (d) evaluated to determine compliance with all characteristics listed in the BDS. 11.3 The Procuring Agency shall retain the sample(s) of the successful Bidder. A Procuring Agency shall reject the Bid if the sample(s)- (a) do(es) not conform to all characteristics prescribed in the bidding documents; and (b) is / are not submitted within the specified time clearly mentioned in the Bid Data Sheet. 11.4 Where it is not possible to avoid using a propriety article as a sample, a Bidder shall make it clear that the propriety article is displayed only as an example of the type or quality of the goods being Bided for, and that competition shall not thereby be limited to the extent of that article only. 11.5 Samples made up from materials supplied by a Procuring Agency shall not be returned to a Bidder nor shall a Procuring Agency be liable for the cost of making them. 11.6 All samples produced from materials belonging to an unsuccessful Bidder shall be kept by the Procuring Agency till thirty (30) days from the date of award of contract or exhaust of all the grievance forums (including those pending at Authority's Level or in some Court of Law).
12. Documents Establishing	12.1 Pursuant to ITB 11, the Bidder shall furnish, as part of its Bid, all those documents establishing the eligibility in conformity to

Eligibility of the Goods and Related Services and Conformity to Bidding Documents	the terms and conditions specified in the Bidding Documents for all goods and related services which the Bidder proposes to deliver. 12.2 The documentary evidence of the eligibility of all goods and related services shall consist of a statement in the Price Schedule of the country of origin of the goods and related services offered which shall be confirmed by a certificate of origin issued at the time of shipment. 12.3 The documentary evidence of conformity of the goods and related services to the Bidding Documents may be in the form of literature, drawings, and data, and shall consist of: a. a detailed description of the essential technical specifications and performance characteristics of the Goods; b. an item-by-item commentary on the Procuring Agency's Technical Specifications demonstrating substantial responsiveness of the Goods and Services to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications; c. any other procurement specific documentation requirement as stated in the BDS. 12.4 The Bidder shall also furnish a list giving full particulars, including available sources and current prices of goods, spare parts, special tools, etc., necessary for the proper and continuing functioning of the Goods during the period specified in the BDS following commencement of the use of the goods by the Procuring Agency. 12.5 For purposes of the commentary to be furnished pursuant to ITB 12.3(c) above, the Bidder shall note that standards for workmanship, material, and equipment, as well as references to brand names or catalogue numbers designated by the Procuring Agency in its Technical Specifications, are intended to be descriptive only and not restrictive. The Bidder may substitute alternative standards, brand names, and/or catalogue numbers in its Bid, provided that it demonstrates to the Procuring Agency's satisfaction that the substitutions ensure substantial equivalence to those designated in the Technical Specifications. 12.6 The required documents and other accompanying documents must be in English. In case any other language than English is used the pertinent translation into English shall be attached to the original version.
13. Documents Establishing the Eligibility and	13.1 Pursuant to ITB 11, the Bidder shall furnish, as part of its Bid, all those documents establishing the Bidder's eligibility to

Qualification of the Bidder	participate in the bidding process and/or its qualification to perform the contract if its Bid is accepted. 13.2 The documentary evidence of the Bidder's eligibility to Bid shall establish to the satisfaction of the Procuring Agency that the Bidder, at the time of submission of its bid, is from an eligible country as defined in Section-4 titled as "Eligible Countries". 13.3 The documentary evidence of the Bidder's qualifications to perform the contract if its Bid is accepted shall establish to the satisfaction of Procuring Agency that: a) in the case of a Bidder offering to deliver the goods under the contract which the Bidder did not manufacture or otherwise produce, the Bidder has been duly authorized by the Manufacturer or producer to deliver the goods in Pakistan; b) The Bidder has the financial, technical, and supply/production capability necessary to perform the Contract, meets the qualification criteria specified in BDS. c) in the case of a Bidder not doing business within Pakistan, the Bidder is or will be (if awarded the contract) represented by an Agent in Pakistan equipped, and able to carry out the Supplier's maintenance, repair, and spare parts-stocking obligations prescribed in the Conditions of Contract and/or Technical Specifications. d) That the Bidder meets the qualification criteria listed in the Bid Data Sheet.
14. Form of Bid	14.1 The Bidder shall fill the Form of Bid furnished in the Bidding Documents. The Bid Form must be completed without any alterations to its format and no substitute shall be accepted.
15. Bid Prices	15.1 The Bid Prices and discounts quoted by the Bidder in the Form of Bid and in the Price Schedules shall conform to the requirements specified below in ITB Clause 15 or exclusively mentioned hereafter in the bidding documents. 15.2 All items in the Schedule of requirement must be listed and priced separately in the Price Schedule(s). If a Price Schedule shows items listed but not priced, their prices shall be construed to be included in the prices of other items. 15.3 Items not listed in the Price Schedule shall be assumed not to be included in the Bid, and provided that the Bid is still substantially responsive in their absence or due to their nominal nature, the corresponding average price of the respective item(s) of the remaining substantially responsive bidder(s) shall be construed to be the price of those missing item(s):

	Provided that: a) where there is only one (substantially) responsive bidder, or b) where there is provision for alternate proposals and the respective items are not listed in the other bids, The procuring agency may fix the price of missing items in accordance with market survey, and the same shall be considered as final price. 15.4 The Bid price to be quoted in the Form of Bid in accordance with ITB 15.1 shall be the total price of the Bid, excluding any discounts offered. 15.5 The Bidder shall indicate on the appropriate Price Schedule, the unit prices (where applicable) and total Bid price of the goods it proposes to deliver under the contract. 15.6 Prices indicated on the Price Schedule shall be entered separately in the following manner: a) For goods manufactured from within Pakistan (or within the country where procurement is being done in case of foreign missions abroad): i. The price of the goods quoted EXW (ex-works, ex-factory, ex-warehouse, ex-showroom, or off-the-shelf, as applicable), including all customs duties and sales and other taxes already paid or payable: A. on the components and raw material used in the manufacturing or assembly of goods quoted ex- works or ex-factory; OR B. on the previously imported goods of foreign origin quoted ex-warehouse, ex-showroom, or off-the-shelf. ii. All applicable taxes which will be payable on the goods if the contract is awarded. iii. The price for inland transportation, insurance, and other local costs incidental to delivery of the goods to their final destination, if specified in the BDS. iv. The price of other (incidental or allied) services, if any, listed in the BDS. b) For goods offered from abroad:

	i. The price of the goods shall be quoted CIF named port of destination, or CIP border point, or CIP named place of destination, in the Procuring Agency's country, as specified in the BDS. In quoting the price, the Bidder shall be free to use transportation through carriers registered in any eligible countries. Similarly, the Bidder may obtain insurance services from any eligible source country. Or ii. The price of the goods quoted FOB port of shipment (or FCA, as the case may be), if specified in the BDS. or iii. The price of goods quoted CFR port of destination (or CPT as the case may be), if specified in the BDS. iv. the price for inland transportation, insurance, and other local costs incidental to delivery of the goods from the port of entry to their final destination, if specified in the BDS. v. The price of (incidental) services, if any, listed in the BDS. 15.7 Prices proposed on the Price Schedule for goods and related services shall be disaggregated, where appropriate as indicated in this Clause. This desegregation shall be solely for the purpose of facilitating the comparison of Bids by the Procuring Agency. This, shall not in any way limit the Procuring Agency's right to contract on any of the terms and conditions offered: - a) For Goods: - i) the price of the Goods, quoted as per applicable INCOTERMS as specified in the BDS ii) all customs duties, sales tax, and other taxes applicable on goods or on the components and raw materials used in their manufacture or assembly, if the contract is awarded to the Bidder, and b) For Related Services i) The price of the related services, and ii) All customs duties, sales tax and other taxes applicable in Pakistan, paid or payable, on the related services, if the contract is awarded to the Bidder. 15.8 Prices quoted by the Bidder shall be fixed during the Bidder's performance of the contract and not subject to variation on any account. A Bid submitted with an adjustable price will be treated as non-responsive and shall be rejected, pursuant to ITB 29. 15.9 If so indicated in the Invitation to Bids and Instructions to Bidders, that Bids are being invited for individual contracts

	(Lots) or for any combination of contracts (packages), Bidders wishing to offer any price reduction for the award of more than one contract shall specify in their Bid the price reductions applicable to each package, or alternatively, to individual contracts (Lots) within a package.
16. Bid Currencies	16.1 Prices shall be quoted in the following currencies: a) For goods and services that the Bidder will deliver from within Pakistan, the prices shall be quoted in Pakistani Rupees, unless otherwise specified in the BDS. b) For goods and related services that the Bidder will deliver from outside Pakistan, or for imported parts or components of goods and related services originating outside Pakistan, the Bid prices shall be quoted in any freely convertible currency of another country. If the Bidder wishes to be paid in a combination of amounts in different currencies, it may quote its price accordingly but use no more than three foreign currencies. 16.2 For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding documents. The rate of exchange shall be the selling rate, prevailing on the date of opening of (financial part of) bids specified in the bidding documents, as notified by the State Bank of Pakistan on that day. 16.3 Bidders shall indicate details of their expected foreign currency requirements in the Bid. 16.4 Bidders may be required by the Procuring Agency to clarify their foreign currency requirements and to substantiate that the amounts included in Lump Sum and in the SCC are reasonable and responsive to ITB 16.1.
17. Bid Validity Period	17.1 Bids shall remain valid for the period specified in the BDS after the Bid submission deadline prescribed by the Procuring Agency. A Bid valid for a shorter period shall be rejected by the Procuring Agency as non-responsive. The period of Bid validity will be determined from the complementary bid securing instrument i.e., the expiry period of bid security or bid securing declaration as the case may be. 17.2 Under exceptional circumstances, prior to the expiration of the initial Bid validity period, the Procuring Agency may request the Bidders' consent to an extension of the period of validity of their Bids only once, for the period not more than the period of initial bid validity. The request and the Bidders responses shall be made in writing or in electronic forms that provide record of the content of communication. The Bid Security provided under ITB 18 shall also be suitably

	extended. A Bidder may refuse the request without forfeiting its Bid security or causing to be executed its Bid Securing Declaration. A Bidder agreeing to the request will not be required nor permitted to modify its Bid, but will be required to extend the validity of its Bid Security or Bid Securing Declaration for the period of the extension, and in compliance with ITB 18 in all respects. 17.3 If the award is delayed by a period exceeding sixty (60) days beyond the expiry of the initial Bid validity period, the contract price may be adjusted by a factor specified in the request for extension. However, the Bid evaluation shall be based on the already quoted Bid Price without taking into consideration on the above correction.
18. Bid Security or Bid Securing Declaration	18.1 Pursuant to ITB 11, unless otherwise specified in the BDS, the Bidder shall furnish as part of its Bid, a Bid Security in form of fixed amount not exceeding five percent of the estimated value of procurement determined by the procuring agency and in the amount and currency specified in the BDS or Bid Securing Declaration as specified in the BDS in the format provided in Section VI (Standard Forms). 18.2 The Bid Security or Bid Securing Declaration is required to protect the Procuring Agency against the risk of Bidder's conduct which would warrant the security's forfeiture, pursuant to ITB 18.9. 18.3 The Bid Security shall be denominated in the local currency or in another freely convertible currency, and it shall be in the form specified in the BDS which shall be in any of the following: a) a bank guarantee, an irrevocable letter of credit issued by a Scheduled bank in the form provided in the Bidding Documents or another form acceptable to the Procuring Agency and valid for twenty-eight (28) days beyond the end of the validity of the Bid. This shall also apply if the period for Bid Validity is extended. In either case, the form must include the complete name of the Bidder; b) a cashier's or certified cheque; or c) another security if indicated in the BDS 18.4 The Bid Security or Bid Securing Declaration shall be in accordance with the Form of the Bid Security or Bid Securing Declaration included in Section VI (Standard Forms) or another form approved by the Procuring Agency prior to the Bid submission.

	18.5 The Bid Security shall be payable promptly upon written demand by the Procuring Agency in case any of the conditions listed in ITB 18.9 are invoked. 18.6 Any Bid not accompanied by a Bid Security or Bid Securing Declaration in accordance with ITB 18.1 or 18.3 shall be rejected by the Procuring Agency as non-responsive, pursuant to ITB 29. 18.7 Unsuccessful Bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bid Validity prescribed by the Procuring Agency pursuant to ITB 17. The Procuring Agency shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security document, after whichever of the following that occurs earliest: (a) the expiry of the Bid Security; (b) the entry into force of a procurement contract and the provision of a performance security (or guarantee), for the performance of the contract if such a security (or guarantee), is required by the Bidding documents; (c) the rejection by the Procuring Agency of all Bids; (d) the withdrawal of the Bid prior to the deadline for the submission of Bids, unless the Bidding documents stipulate that no such withdrawal is permitted. 18.8 The successful Bidder's Bid Security will be discharged upon the Bidder signing the contract pursuant to ITB 42, or furnishing the performance guarantee, pursuant to ITB 43. 18.9 The Bid Security may be forfeited or the Bid Securing Declaration executed: a) if a Bidder: i) withdraws its Bid during the period of Bid Validity as specified by the Procuring Agency, and referred by the bidder on the Form of Bid except as provided for in ITB 17.2; or ii) does not accept the correction of errors pursuant to ITB 31.2; or b) in the case of a successful Bidder, if the Bidder fails: i) to sign the contract in accordance with ITB 42; or ii) to furnish performance security (or guarantee) in accordance with ITB 43.

19. Alternative Bids by Bidders	19.1 Bidders shall submit offers that comply with the requirements of the Bidding Documents, including the basic Bidder's technical design as indicated in the specifications and Schedule of Requirements. Alternatives will not be considered, unless specifically allowed for in the BDS. If so allowed, ITB 19.2 shall prevail. 19.2 When alternative schedule for supply and installation of equipment is explicitly invited, a statement of that effect will be included in the BDS as will the method for evaluating different schedule for delivery of goods. 19.3 If so allowed in the BDS, Bidders wishing to offer technical alternatives to the requirements of the Bidding Documents must also submit a Bid that complies with the requirements of the Bidding Documents, including the basic technical design as indicated in the specifications. In addition to submitting the basic Bid, the Bidder shall provide all information necessary for a complete evaluation of the alternative by the Procuring Agency, including technical specifications, breakdown of prices, and other relevant details. Only the technical alternatives, if any, of the Most Advantageous Bidder conforming to the basic technical requirements (without altering the bid price) shall be considered by the Procuring Agency.
20. Withdrawal, Substitution, and Modification of Bids	20.1 Before bid submission deadline, any bidder may withdraw, substitute, or modify its Bid after it has been submitted by sending a written notice, duly signed by an authorized representative, and the corresponding substitution or modification must accompany the respective written notice. 20.2 Bids requested to be withdrawn in accordance with ITB 20.1 shall be returned unopened to the Bidders.
21. Format and Signing of Bid	21.1 The Bidder shall prepare an original and the number of copies of the Bid as indicated in the BDS, clearly marking each "ORIGINAL" and "COPY," as appropriate. In the event of any discrepancy between them, the original shall prevail: Provided that except in Single Stage One Envelope Procedure, the Bid shall include only the copies of technical proposal. 21.2 The original and the copy or copies of the Bid shall be typed or written in indelible ink and shall be signed by the Bidder or a person or persons duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the BDS and shall be attached to the Bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid, except for un-amended printed literature, shall be initialed by the person or persons signing the Bid.

	21.3 Any interlineations, erasures, or overwriting shall be valid only if they are signed by the person or persons signing the Bidder.
D. Submission of Bids	
22. Sealing and Marking of Bids	22.1 In case of Single Stage One Envelope Procedure, the Bidder shall seal the original and each copy of the Bid in separate envelopes, duly marking the envelopes as "ORIGINAL" and "COPY." The envelopes shall then be sealed in an outer envelope securely sealed in such a manner that opening and resealing cannot be achieved undetected. Note: <i>The envelopes shall be sealed and marked in accordance with the bidding procedure adopted as referred in Rule-36 of PPR-2004.</i> 22.2 The inner and outer envelopes shall: a) be addressed to the Procuring Agency at the address given in the BDS; and b) bear the title of the subject procurement or Project name, as the case may be as indicated in the BDS, the Invitation to Bids (ITB) title and number indicated in the BDS, and a statement: "DO NOT OPEN BEFORE," to be completed with the time and the date specified in the BDS, pursuant to ITB 23.1. 22.3 In case of Single Stage Two Envelope Procedure, The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Proposal and the other Financial Proposal. Both envelopes to be enclosed together in an outer single envelope called the Bid. Each Bidder shall submit his bid as under: a) Bidder shall submit his TECHNICAL PROPOSAL and FINANCIAL PROPOSAL in separate inner envelopes and enclosed in a single outer envelope. b) ORIGINAL and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such. c) The envelopes containing the ORIGINAL and copies will be put in one sealed envelope and addressed / identified as given in Sub- Clause 21.2. 22.4 The inner and outer envelopes shall: a) be addressed to the Procuring Agency at the address provided in the Bidding Data; b) bear the name and identification number of the contract as defined in the Bidding Data; and provide a warning not to open before the time and date for bid opening, as specified in the Bidding Data. pursuant to ITB 23.1. c) In addition to the identification required in Sub- Clause 21.2 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.24 If all envelopes are not sealed and marked as require by ITB 22.2, ITB 22.3 and ITB 22.4 or incorrectly marked, the Procuring Agency will assume no responsibility for the misplacement or premature opening of Bid
23. Deadline for Submission of Bids	23.1 Bids shall be received by the Procuring Agency no later than the date and time specified in the BDS. 23.2 The Procuring Agency may, in exceptional circumstances and at its discretion, extend the deadline for the submission of Bids by amending the Bidding Documents in accordance with ITB 9, in which case all rights and obligations of the Procuring Agency and Bidders previously subject to the deadline will thereafter be subject to the new deadline.
24. Late Bids	24.1 The Procuring Agency shall not consider for evaluation any Bid that arrives after the deadline for submission of Bids, in accordance with ITB 23. 24.2 Any Bid received by the Procuring Agency after the deadline for submission of Bids shall be declared late, recorded, rejected and returned unopened to the Bidder.
25. Withdrawal, of Bids	25.1 A Bidder may withdraw its Bid after it has been submitted, provided that written notice of the withdrawal of the Bid, is received by the Procuring Agency prior to the deadline for submission of Bids. 25.2 Revised bid may be submitted after the withdrawal of the original bid in accordance with the provisions referred in ITB 22.
E. Opening and Evaluation of Bids	
26. Opening of Bids	26.1 The Procuring Agency will open all Bids, in public, in the presence of Bidders' or their representatives who choose to attend, and other parties with a legitimate interest in the Bid proceedings at the place, on the date and at the time, specified in the BDS. The Bidders' representatives present shall sign a register as proof of their attendance. 26.2 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. 26.3 Second, outer envelopes marked "SUBSTITUTION" shall be opened. The inner envelopes containing the Substitution Bid shall be exchanged for the corresponding Original Bid being

	substituted, which is to be returned to the Bidder unopened. 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. 26.4 Next, outer envelopes marked "MODIFICATION" shall be opened. No Technical Proposal and/or Financial Proposal 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 the Bids. Any Modification shall be read out along with the Original Bid except in case of Single Stage Two Envelope Procedure where only the Technical Proposal, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Financial Proposal, both Original and Modification, will remain unopened till the prescribed financial bid opening date. 26.5 Other envelopes holding the Bids shall be opened one at a time, in case of Single Stage One Envelope Procedure, the Bidders names, the Bid prices, the total amount of each Bid and of any alternative Bid (if alternatives have been requested or permitted), any discounts, the presence or absence of Bid Security, Bid Securing Declaration and such other details as the Procuring Agency may consider appropriate, will be announced by the Procurement Evaluation Committee. 26.6 In case of Single Stage Two Envelope Procedure, the Procuring Agency will open the Technical Proposals in public at the address, date and time specified in the BDS in the presence of Bidders' designated representatives who choose to attend and other parties with a legitimate interest in the Bid proceedings. The Financial Proposals will remain unopened and will be held in custody of the Procuring Agency until the specified time of their opening. 26.7 The envelopes holding the Technical Proposals 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 Procuring Agency may consider appropriate. 26.8 Bids not opened and not read out at the Bid opening shall not be considered further for evaluation, irrespective of the circumstances. In particular, any discount offered by a Bidder which is not read out at Bid opening shall not be considered further. 26.9 Bidders are advised to send in a representative with the knowledge of the content of the Bid who shall verify the information read out from the submitted documents. Failure to send a representative or to point out any un-read

	information by the sent Bidder's representative shall indemnify the Procuring Agency against any claim or failure to read out the correct information contained in the Bidder's Bid. 26.10 No Bid will be rejected at the time of Bid opening except for late Bids which will be returned unopened to the Bidder, pursuant to ITB 24. 26.11 The Procuring Agency shall prepare minutes of the Bid opening. The record of the Bid opening shall include, as a minimum: the name of the Bidder and whether or not there is a withdrawal, substitution or modification, the Bid price if applicable, including any discounts and alternative offers and the presence or absence of a Bid Security or Bid Securing Declaration. 26.12 The Bidders' representatives who are present shall be requested to sign on the attendance sheet. The omission of a Bidder's signature on the record shall not invalidate the contents and affect the record. A copy of the record shall be distributed to all the Bidders. 26.13 A copy of the minutes of the Bid opening shall be furnished to individual Bidders upon request. 26.14 In case of Single Stage Two Envelop Bidding Procedure, after the evaluation and approval of technical proposal the procuring agency, shall at a time within the bid validity period, publically open the financial proposals of the technically accepted bids only. The financial proposal of bids found technically non-responsive shall be returned unopened to the respective bidders subject to redress of the grievances from all tiers of grievances.
27. Confidentiality	27.1 Information relating to the examination, clarification, evaluation and comparison of Bids and recommendation of contract award shall not be disclosed to Bidders or any other persons not officially concerned with such process until the time of the announcement of the respective evaluation report. 27.2 Any effort by a Bidder to influence the Procuring Agency processing of Bids or award decisions may result in the rejection of its Bid. 27.3 Notwithstanding ITB 27.2 from the time of Bid opening to the time of contract award, if any Bidder wishes to contact the Procuring Agency on any matter related to the Bidding process, it should do so in writing or in electronic forms that provides record of the content of communication.
28. Clarification of Bids	28.1 To assist in the examination, evaluation and comparison of Bids of the Bidders, the Procuring Agency may, ask any Bidder for a clarification. Any clarification submitted by a Bidder that

	is not in response to a request by the Procuring Agency shall not be considered. 28.2 The request for clarification and the response shall be in writing or in electronic forms that provide record of the content of communication. In case of Single Stage Two Envelope Procedure, no change in the prices or substance of the Bid shall be sought, offered, or permitted, whereas in case of Single Stage One Envelope Procedure, only the correction of arithmetic errors discovered by the Procuring Agency in the evaluation of Bids should be sought in accordance with ITB 31. 28.3 The alteration or modification in THE BID which in any affect the following parameters will be considered as a change in the substance of a bid: a. evaluation & qualification criteria; b. required scope of work or specifications; c. all securities requirements; d. tax requirements; e. terms and conditions of bidding documents. f. change in the ranking of the bidder 28.4 From the time of Bid opening to the time of Contract award if any Bidder wishes to contact the Procuring Agency on any matter related to the Bid it should do so in writing or in electronic forms that provide record of the content of communication.
29. Preliminary Examination of Bids	29.1 Prior to the detailed evaluation of Bids, the Procuring Agency will determine whether each Bid: a. meets the eligibility criteria defined in ITB 3 and ITB 4; b. has been prepared as per the format and contents defined by the Procuring Agency in the Bidding Documents; c. has been properly signed; d. is accompanied by the required securities; and e. is substantially responsive to the requirements of the Bidding Documents. The Procuring Agency's determination of a Bid's responsiveness will be based on the contents of the Bid itself. 29.2 A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one that: -

	a. affects in any substantial way the scope, quality, or performance of the Services; b. limits in any substantial way, inconsistent with the Bidding Documents, the Procuring Agency's rights or the Bidders obligations under the Contract; or c. if rectified, would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.
29.3	The Procuring Agency will confirm that the documents and information specified under ITB 11, 12 and 13 have been provided in the Bid. If any of these documents or information is missing, or is not provided in accordance with the Instructions to Bidders, the Bid shall be rejected.
29.4	The Procuring Agency may waive off any minor informality, nonconformity, or irregularity in a Bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder. <i>Explanation:</i> A minor informality, non-conformity or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a Bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is immaterial when the effect on quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the supplies or services being acquired. The Procuring Agency either shall give the bidder an opportunity to cure any deficiency resulting from a minor informality or irregularity in a bid or waive the deficiency, whichever is advantageous to the Procuring Agency. Examples of minor informalities or irregularities include failure of a bidder to – (a) Submit the number of copies of signed bids required by the invitation; (b) Furnish required information concerning the number of its employees; (c) The firm submitting a bid has formally adopted or authorized, before the date set for opening of bids, the execution of documents by typewritten, printed, or stamped signature and submits evidence of such authorization and the bid carries such a signature.
29.5	Provided that a Technical Bid is substantially responsive, the Procuring Agency may request the Bidder to submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities or omissions in the Technical Bid related to

	documentation requirements. Requesting information or documentation on such nonconformities shall not be related to any such aspect of the technical Proposal linked with the ranking of the bidders. Failure of the Bidder to comply with the request may result in the rejection of its Bid. 29.6 Provided that a Technical Bid is substantially responsive, the Procuring Agency shall rectify quantifiable nonmaterial nonconformities or omissions related to the Financial Proposal. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of the missing or nonconforming item or component. 29.7 If a Bid is not substantially responsive, it will be rejected by the Procuring Agency and may not subsequently be evaluated for complete technical responsiveness.
30. Examination of Terms and Conditions; Technical Evaluation	30.1 The Procuring Agency shall examine the Bid to confirm that all terms and conditions specified in the GCC and the SCC have been accepted by the Bidder without any material deviation or reservation. 30.2 The Procuring Agency shall evaluate the technical aspects of the Bid submitted in accordance with ITB 22, to confirm that all requirements specified in Section V – Schedule of Requirements, Technical Specifications of the Bidding Documents have been met without material deviation or reservation. 30.3 If after the examination of the terms and conditions and the technical evaluation, the Procuring Agency determines that the Bid is not substantially responsive in accordance with ITB 29, it shall reject the Bid.
31. Correctness of Errors	31.1 Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: - 31.2 if there is a discrepancy between unit prices and the total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the total price shall be corrected, unless in the opinion of the Procuring Agency there is an obvious misplacement of the decimal point in the unit price, in which the total price as quoted shall govern and the unit price shall be corrected; 31.3 if there is an error in a total corresponding to the addition or subtraction of sub-totals, the sub-totals shall prevail and the total shall be corrected; and a. where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

	b. Where there is discrepancy between grand total of price schedule and amount mentioned on the Form of Bid, the amount referred in Price Schedule shall be treated as correct subject to elimination of other errors. 31.4 The amount stated in the Bid will, be adjusted by the Procuring Agency 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 amount, its Bid will then be rejected, and the Bid Security may be forfeited or the Bid Securing Declaration may be executed in accordance with ITB 18.9.
32. Conversion to Single Currency	32.1 To facilitate evaluation and comparison, the Procuring Agency will convert all Bid prices expressed in the amounts in various currencies in which the Bid prices are payable. For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding documents. The rate of exchange shall be the selling rate, prevailing on the date of opening of (financial part of) bids specified in the bidding documents, as notified by the State Bank of Pakistan on that day. 32.2 The currency selected for converting Bid prices to a common base for the purpose of evaluation, along with the source and date of the exchange rate, are specified in the BDS.
33. Evaluation of Bids	33.1 The Procuring Agency shall evaluate and compare only the Bids determined to be substantially responsive, pursuant to ITB 29. 33.2 In evaluating the Technical Proposal of each Bid, the Procuring Agency shall use the criteria and methodologies listed in the BDS and in terms of Statement of Requirements and Technical Specifications. No other evaluation criteria or methodologies shall be permitted. 33.3 The Procuring Agency's evaluation of a Bid will take into account: a. in the case of goods manufactured in Pakistan or goods of foreign origin already imported in Pakistan, Income Tax, General Sales Tax and other similar/applicable taxes, which will be payable on the goods if a contract is awarded to the Bidder; b. in the case of goods of foreign origin offered from abroad, customs duties and other similar import taxes which will be payable on the goods if the contract is awarded to the Bidder; and

	33.4 The comparison shall be between the EXW price of the goods offered from within Pakistan, such price to include all costs, as well as duties and taxes paid or payable on components and raw material incorporated or to be incorporated in the goods, and named port of destination, border point, or named place of destination) in accordance with applicable INCOTERM in the price of the goods offered from outside Pakistan. In evaluating the Bidders, the evaluation committee will, in addition to the Bid price quoted in accordance with ITB 15.1, take account of one or more of the following factors as specified in the BDS, and quantified in ITB 32.5: a. Cost of inland transportation, insurance, and other costs within the Pakistan incidental to delivery of the goods to their final destination. b. delivery schedule offered in the Bid; c. deviations in payment schedule from that specified in the Special Conditions of Contract; d. the cost of components, mandatory spare parts, and service; e. the availability (in Pakistan) of spare parts and after-sales services for the equipment offered in the Bid; f. the projected operating and maintenance costs during the life of the equipment; g. the performance and productivity of the equipment offered; and/or; h. other specific criteria indicated in the BDS, and/or in the Technical Specifications. 33.5 For factors retained in BDS, pursuant to ITB 33.4 one or more of the following quantification methods will be applied, as detailed in the BDS: a. <i>Inland transportation from EXW/port of entry/border point, Insurance and incidentals:</i> Inland transportation, insurance, and other incidental costs for delivery of the goods from EXW/port of entry/border point to Project Site named in the BDS will be computed for each Bid by the PA on the basis of published tariffs by the rail or road transport agencies, insurance companies, and/or other appropriate sources. To facilitate such computation, Bidder shall furnish in its Bid the estimated dimensions and shipping weight and the approximate EXW or as per applicable INCOTERM value of each package. The above cost will be added by the Procuring Agency to EXW or as per applicable INCOTERM price. b. <i>Delivery Schedule</i> i) The Procuring Agency requires that the goods under the Invitation for Bids shall be delivered (shipped) at the time specified in the Schedule of Requirements.

	The estimated time of arrival of the goods at the Project Site will be calculated for each Bid after allowing for reasonable international and inland transportation time. Treating the Bid resulting in such time of arrival as the base, a delivery “adjustment” will be calculated for other Bids by applying a percentage, specified in the BDS, of the EXW or as per applicable INCOTERM price for each week of delay beyond the base, and this will be added to the Bid price for evaluation. No credit shall be given to early delivery. OR ii) The goods covered under this invitation are required to be delivered (shipped) within an acceptable range of weeks specified in the Schedule of Requirement. No credit will be given to earlier deliveries, and Bids offering delivery beyond this range will be treated as non-responsive. Within this acceptable range, an adjustment per week, as specified in the BDS, will be added for evaluation to the Bid price of Bids offering deliveries later than the earliest delivery period specified in the Schedule of Requirements. OR iii) The goods covered under this invitation are required to be delivered (shipped) in partial shipments, as specified in the Schedule of Requirements. Bids offering deliveries earlier or later than the specified deliveries will be adjusted in the evaluation by adding to the Bid price a factor equal to a percentage, specified in the BDS, of EXW or as per applicable INCOTERM price per week of variation from the specified delivery schedule. c. <i>Deviation in Payment Schedule</i> i) Bidders shall state their Bid price for the payment schedule outlined in the SCC. Bids will be evaluated on the basis of this base price. Bidders are, however, permitted to state an alternative payment schedule and indicate the reduction in Bid price they wish to offer for such alternative payment schedule. The Procuring Agency may consider the alternative payment schedule offered by the selected Bidder. OR ii) The SCC stipulates the payment schedule offered by the Procuring Agency. If a Bid deviates from the schedule and if such deviation is considered acceptable to the Procuring Agency, the Bid will be evaluated by calculating interest earned for any earlier payments involved in the terms outlined in the Bid as compared with those stipulated in this invitation, at the rate per annum specified in the BDS.

d. Cost of Spare Parts

- i) The list of items and quantities of major assemblies, components, and selected spare parts, likely to be required during the initial period of operation specified in the **BDS**, is annexed to the Technical Specifications. The total cost of these items, at the unit prices quoted in each Bid, will be added to the Bid price. **OR**
- ii) The Procuring Agency will draw up a list of high-usage and high-value items of components and spare parts, along with estimated quantities of usage in the initial period of operation specified in the **BDS**. The total cost of these items and quantities will be computed from spare parts unit prices submitted by the Bidder and added to the Bid price. **OR**
- iii) The Procuring Agency will estimate the cost of spare parts usage in the initial period of operation specified in the **BDS**, based on information furnished by each Bidder, as well as on past experience of the Procuring Agency or other Procuring Agency's in similar situations. Such costs shall be added to the Bid price for evaluation

e. Spare parts and after sales service facilities in Pakistan

The cost to the Procuring Agency of establishing the minimum service facilities and parts inventories, as outlined in the **BDS** or elsewhere in the Bidding Documents, if quoted separately, shall be added to the Bid price.

f. Operating and maintenance costs

Since the operating and maintenance costs of the goods under procurement form a major part of the life cycle cost of the equipment, these costs will be evaluated in accordance with the criteria specified in the **BDS** or in the Technical Specifications.

g. Performance and productivity of the equipment.

- (i) Bidders shall state the guaranteed performance or efficiency in response to the Technical Specification. For each drop in the performance or efficiency below the norm of 100, an adjustment for an amount specified in the **BDS** will be added to the Bid Price,

	representing the capitalized cost of additional operating costs over the life of the plant, using the methodology specified in the BDS or in the Technical Specifications. OR (ii) Goods offered shall have a minimum productivity specified under the relevant provision in the Technical Specifications to be considered responsive. Evaluation shall be based on the cost per unit of the actual productivity of goods offered in the Bid, and adjustment will be added to the Bid price using the methodology specified in the BDS or in the Technical Specifications. <i>h. Specific Additional Criteria</i> Other specific additional criteria to be considered in the evaluation and the evaluation method shall be detailed in the BDS and/or the Technical Specifications. 33.6 If these Bidding Documents allow Bidders to quote separate prices for different Lots, and the award to a single Bidder of multiple Lots, the methodology of evaluation to determine the lowest evaluated Lot combinations, including any discounts offered in the Form of Bid, is specified in the BDS.
34. Domestic Preferences	34.1 If the BDS so specifies, the Procuring Agency will grant a margin of preference to certain goods in line with the rules, regulations, regulatory guides or instructions issued by the Authority from time to time.
35. Determination of Most Advantageous Bid	35.1 In case where the Procuring Agency adopts the Cost Based Evaluation Technique and, the Bid with the lowest evaluated price—from amongst those which are eligible, compliant and substantially responsive shall be the Most Advantageous Bid. 35.2 The Procuring Agency may adopt the Quality & Cost Based Selection Technique due to the following two reasons: i. Where the Procuring Agency knows about the main features, usage and output of the products; however not clear about the complete features, technical specifications and functionalities of the goods to be procured and requires the bidders to submit their proposals defining those features, specifications and functionalities; or ii. Where the Procuring Agency, in addition to the mandatory requirements and mandatory technical specifications, requires parameters specified in Evaluation Criteria to be evaluated while determining the quality of the goods:

	In such cases, the Procuring Agency may allocate certain weightage to these factors as a part of Evaluation Criteria, and may determine the ranking of the bidders on the basis of combined evaluation in accordance with provisions of Rule 2(1)(h) of PPR-2004.
36. Post qualification of Bidder and/or Abnormally Low Financial Proposal	36.1 After determining the Most Advantageous Bid, if neither the pre-qualification was undertaken separately nor any qualification parameters were undertaken as part of determining the Most Advantageous Bid, the Procuring Agency shall carry out the post-qualification of the Bidder using only the requirements specified in the BDS. In case of International Tendering, the parameters for incorporation or licensing within Pakistan may be fulfilled as part of post qualification. 36.2 Where the Bid price is considered to be abnormally low, the Procuring Agency shall perform price analysis either during determination of Most Advantageous Bid or as a part of the post-qualification process. The following process shall apply: (a) The Procuring Agency may reject a Bid if the Procuring Agency has determined that the price in combination with other constituent elements of the Bid is abnormally low in relation to the subject matter of the procurement (i.e. scope of the procurement or ancillary services) and raises concerns as to the capability and capacity of the respective Bidder to perform that contract (b) Before rejecting an abnormally low Bid the Procuring Agency shall request the Bidder an explanation of the Bid or of those parts which it considers contribute to the Bid being abnormally low; take account of the evidence provided in response to a request in writing; and subsequently verify the Bid or parts of the Bid being abnormally low; (c) The decision of the Procuring Agency to reject a Bid and reasons for the decision shall be recorded in the procurement proceedings and promptly communicated to the Bidder concerned; (d) The Procuring Agency shall not incur any liability solely by rejecting abnormally Bid; and (e) An abnormally low Bid means, in the light of the Procuring Agency's estimate and of all the Bids submitted, the Bid appears to be abnormally low by not providing a margin for normal levels of profit. <u>Guidance for Procuring Agency:</u> In order to identify the Abnormally Low Bid (ALB) following

	approaches can be considered to minimize the scope of subjectivity: (i) Comparing the bid price with the cost estimate; (ii) Comparing the bid price with the bids offered by other bidders submitting substantially responsive bids; and (iii) Comparing the bid price with prices paid in similar contracts in the recent past either government- or development partner-funded. 36.3 The Procuring Agency will determine to its satisfaction whether the Bidder that is selected as having submitted the most advantageous Bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB 13.3. 36.4 The determination will take into account the Bidder's financial, technical, and production capabilities. It will be based upon an examination of the documentary evidence of the Bidder's qualifications submitted by the Bidder, pursuant to ITB 13.3, as well as such other information as the Procuring Agency deems necessary and appropriate. Factors not included in these Bidding Documents shall not be used in the evaluation of the Bidders' qualifications. 36.5 Procuring Agency may seek "Certificate for Independent Price Determination" from the Bidder and the results of reference checks may be used in determining award of contract. Explanation: The Certificate shall be furnished by the bidder. The bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc. 36.6 An affirmative determination will be a prerequisite for award of the contract to the Bidder. A negative determination will result in rejection of the Bidder's Bid, in which event the Procuring Agency will proceed to the next ranked bidder to make a similar determination of that Bidder's capabilities to perform satisfactorily.
F. Award of Contract	
37. Criteria of Award	37.1 Subject to ITB 36 and 38, the Procuring Agency will award the Contract to the Bidder whose Bid has been determined to be substantially responsive to the Bidding Documents and who has been declared as Most Advantageous Bidder, provided that such Bidder has been determined to be: a) eligible in accordance with the provisions of ITB 3; b) is determined to be qualified to perform the Contract satisfactorily; and c) Successful negotiations have been concluded, if any.
38. Negotiations	38.1 Negotiations may be undertaken with the Most Advantageous Bid relating to the following areas:

	(a) a minor alteration to the technical details of the statement of requirements; (b) reduction of quantities for budgetary reasons, where the reduction is in excess of any provided for in the Bidding documents; (c) a minor amendment to the special conditions of Contract; (d) finalizing payment arrangements; (e) delivery arrangements; (f) the methodology for provision of related services; or (g) clarifying details that were not apparent or could not be finalized at the time of Bidding; 38.2 Where negotiation fails to result into an agreement, the Procuring Agency may invite the next ranked Bidder for negotiations. Where negotiations are commenced with the next ranked Bidder, the Procuring Agency shall not reopen earlier negotiations.
39. Procuring Agency's Right to reject All Bids	39.1 Notwithstanding ITB 37, the Procuring Agency reserves the right to reject all the bids, and to annul the Bidding process at any time prior to award of contract, without thereby incurring any liability to the affected Bidder or Bidders. However, the Authority (i.e. PPRA) may call from the Procuring Agency the justification of those grounds. 39.2 Notice of the rejection of all Bids shall be given promptly to all Bidders that have submitted Bids. 39.3 The Procuring Agency shall upon request communicate to any Bidder the grounds for its rejection of its Bids, but is not required to justify those grounds
40. Procuring Agency's Right to Vary Quantities at the time of Award	40.1 The Procuring Agency reserves the right at the time of contract award to increase or decrease the quantity of goods or related services originally specified in these Bidding Documents (schedule of requirements) provided this does not exceed by the percentage indicated in the BDS, without any change in unit price or other terms and conditions of the Bid and Bidding Documents.
41. Notification of Award	41.1 Prior to the award of contract, the Procuring Agency shall issue a Final Evaluation Report giving justification for acceptance or rejection of the bids. 41.2 Where no complaints have been lodged, the Bidder whose Bid has been accepted will be notified of the award by the Procuring Agency prior to expiration of the Bid Validity period in writing or electronic forms that provide record of the content of communication. The Letter of Acceptance will state the sum that the Procuring Agency will pay the successful Bidder in consideration for the execution of the scope of works as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price"). 41.3 The notification of award will constitute the formation of the Contract, subject to the Bidder furnishing the Performance Security (or guarantee) in accordance with ITB 43 and signing of

	the contract in accordance with ITB 42.2. 41.4 Upon the successful Bidder's furnishing of the performance security (or guarantee) pursuant to ITB 43, the Procuring Agency will promptly notify each unsuccessful Bidder, the name of the successful Bidder and the Contract amount and will discharge the Bid Security or Bid Securing Declaration of the Bidders pursuant to ITB 18.7.
42. Signing of Contract	42.1 Promptly after notification of award, Procuring Agency shall send the successful Bidder the draft agreement, incorporating all terms and conditions as agreed by the parties to the contract. 42.2 Immediately after the Redressal of grievance by the GRC, and after fulfillment of all conditions precedent of the Contract Form, the successful Bidder and the Procuring Agency shall sign the contract. 42.3 Where no formal signing of a contract is required, purchase order issued to the bidder shall be construed to be the contract.
43. Performance Security (or Guarantee)	43.1 After the receipt of the Letter of Acceptance, the successful Bidder, within the specified time, shall deliver to the Procuring Agency a Performance Security (or Guarantee) in the amount and in the form stipulated in the BDS and SCC, denominated in the type and proportions of currencies in the Letter of Acceptance and in accordance with the Conditions of Contract. 43.2 If the Performance Security (or Guarantee) is provided by the successful Bidder and it shall be in the form specified in the BDS which shall be in any of the following: (a) certified cheque, cashier's or manager's cheque, or bank draft; (b) irrevocable letter of credit issued by a Scheduled bank or in the case of an irrevocable letter of credit issued by a foreign bank, the letter shall be confirmed or authenticated by a Scheduled bank. (c) bank guarantee confirmed by a reputable local bank or, in the case of a successful foreign Bidder, bonded by a foreign bank; or (d) surety bond callable upon demand issued by any reputable surety or insurance company. Any Performance Security (or guarantee) submitted shall be enforceable in Pakistan. 43.3 Failure of the successful Bidder to comply with the requirement of ITB 43.1 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security, in which event the Procuring Agency may make the award to the next ranked Bidder or call for new Bids.
44. Advance Payment	44.1 The advance payment will not be provided in normal circumstances. However, in case where international incoterms

	are involved, the same will be dealt with standard international practices and in the manner as prescribed in ITB 44.2. 44.2 The Procuring Agency will provide an Advance Payment as stipulated in the Conditions of Contract, subject to a maximum amount, as stated in the BDS. The Advance Payment request shall be accompanied by an Advance Payment Security (Guarantee) in the form provided in Section IX. For the purpose of receiving the Advance Payment, the Bidder shall make and estimate of, and include in its Bid, the expenses that will be incurred in order to commence Delivery of Goods. These expenses will relate to the purchase of equipment, machinery, materials, and on the engagement of labor during the first month beginning with the date of the Procuring Agency's "Notice to Commence" as specified in the SCC.
45. Arbitrator	45.1 The Arbitrator shall be appointed by mutual consent of both parties as per the provisions specified in the SCC .
46. Corrupt and Fraudulent Practices	46.1 Procuring Agencies (including beneficiaries of Government funded projects and procurement) as well as Bidders/Suppliers/Contractors under Government financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts, and will avoid to engage in any corrupt and fraudulent practices.
<u>G. Grievance Redressal & Complaint Review Mechanism</u>	
47. Constitution of Grievance Redressal Committee	47.1 Procuring agency shall constitute a Grievance Redressal Committee (GRC) comprising of odd number of person with proper power and authorization to address the complaint. The GRC shall not have any of the members of Procurement Evaluation Committee. The committee must have one subject specialist depending the nature of the procurement.
48. GRC Procedure	48.1 Any party can file its written complaint against the eligibility parameters or any other terms and conditions prescribed in the prequalification or bidding documents found contrary to provision of Procurement Regulatory Framework, and the same shall be addressed by the GRC well before the bid submission deadline. 48.2 Any Bidder feeling aggrieved by any act of the procuring agency after the submission of his bid may lodge a written complaint concerning his grievances not later than seven days of the announcement of technical evaluation report and five days after issuance of final evaluation report. 48.3 In case, the complaint is filed against the technical evaluation report, the GRC shall suspend the procurement proceedings. 48.4 In case, the complaint is filed after the issuance of the final evaluation report, the complainant cannot raise any objection on technical evaluation of the report: Provided that the complainant may raise the objection on any

	part of the final evaluation report in case where single stage one envelope bidding procedure is adopted. 48.5 The GRC, in both the cases shall investigate and decide upon the complaint within ten days of its receipt. 48.6 Any bidder or the procuring agency not satisfied with the decision of the GRC may file Appeal before the Appellate Committee of the Authority on prescribed format after depositing the prescribed fee. 48.7 The Committee, upon receipt of the Appeal against the decision of the GRC complete in all respect shall serve notices in writing upon all the parties to Appeal. 48.8 The committee shall call the record from the concerned procuring agency or the GRC as the case may be, and the same shall be provided within prescribed time. 48.9 The committee may after examination of the relevant record and hearing all the concerned parties, shall decide the complaint within fifteen (15) days of receipt of the Appeal. 48.10 The decision of the Committee shall be in writing and shall be signed by the Head and each Member of the Committee. The decision of the committee shall be final.
<u>H. MECHANISM OF BLACKLISTING</u>	
49. Mechanism of Blacklisting	49.1 The Procuring Agency shall bar for not more than the time prescribed in Rule-19 of the Public Procurement Rules, 2004, from participating in their respective procurement proceedings, bidder or contractor who either: i. Involved in corrupt and fraudulent practices as defined in Rule-2 of Public Procurement Rules; ii. Fails to perform his contractual obligations; and iii. Fails to abide by the id securing declaration; 49.2 The show cause notice shall contain: (a) precise allegation, against the bidder or contractor; (b) the maximum period for which the Procuring Agency proposes to debar the bidder or contractor from participating in any public procurement of the Procuring Agency; and (c) the statement, if needed, about the intention of the Procuring Agency to make a request to the Authority for debarring the bidder or contractor from participating in public procurements of all the procuring agencies. 49.3 The procuring agency shall give minimum of seven days to the bidder or contractor for submission of written reply of the show cause notice. 49.4 In case, the bidder or contractor fails to submit written reply within the requisite time, the Procuring Agency may issue notice for personal hearing to the bidder or contractor/ authorize

	representative of the bidder or contractor and the procuring agency shall decide the matter on the basis of available record and personal hearing, if availed. 49.5 In case the bidder or contractor submits written reply of the show cause notice, the Procuring Agency may decide to file the matter or direct issuance of a notice to the bidder or contractor for personal hearing. 49.6 The Procuring Agency shall give minimum of seven days to the bidder or contractor for appearance before the specified officer of the Procuring Agency for personal hearing. The specified officer shall decide the matter on the basis of the available record and personal hearing of the bidder or contractor, if availed. 49.7 The procuring Agency shall decide the matter within fifteen days from the date of personal hearing unless the personal hearing is adjourned to a next date and in such an eventuality, the period of personal hearing shall be reckoned from the last date of personal hearing. 49.8 The Procuring Agency shall communicate to the bidder or contractor the order of debarring the bidder or contractor from participating in any public procurement with a statement that the bidder or contractor may, within thirty days, prefer a representation against the order before the Authority. 49.9 Such blacklisting or barring action shall be communicated by the procuring agency to the Authority and respective bidder or bidders in the form of decision containing the grounds for such action. The same shall be publicized by the Authority after examining the record whether the procedure defined in blacklisting and debarment mechanism has been adhered to by the procuring agency. 49.10 The bidder may file the review petition before the Review Petition Committee Authority within thirty days of communication of such blacklisting or barring action after depositing the prescribed fee and in accordance with "Procedure of filing and disposal of review petition under Rule-19(3) Regulations, 2021". The Committee shall evaluate the case and decide within ninety days of filing of review petition 49.11 The committee shall serve a notice in writing upon all respondent of the review petition. The notices shall be accompanied by the copies of review petition and all attached documents of the review petition including the decision of the procuring agency. The parties may file written statements along with essential documents in support of their contentions. The Committee may pass such order on the representation may deem fit. 49.12 The Authority on the basis of decision made by the committee either may debar a bidder or contractor from participating in any public procurement process of all or some of the procuring agencies for such period as the deemed appropriate or acquit the bidder from the allegations. The decision of the Authority shall be final.

SECTION III: BID DATA SHEET

Section III. Bid Data Sheet (BDS)

BDS Clause Number	ITB Number	Amendments of, and Supplements to, Clauses in the Instruction to Bidders
1. INTRODUCTION		
1.	1.1	Name of Procuring Agency: Pakistan Security Printing Corporation (Pvt.) Ltd. The Description (as specified in Invitation to Bids) of the Goods is: <i>Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment</i> Completion period: The project completion period shall be twelve (12) months from the award of contract. A kick-off meeting shall be held within ten (10) working days of award. Within fourteen (14) days of award, the contractor shall submit a detailed baseline schedule, resource deployment plan, shop drawings, and material submittals for Client and Consultant approval.
2.	2.1	Financial year for the operations of the Procuring Agency: [2025-26] Name of Project: <i>Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment</i> Name and identification number of the Contract: LP/T-4110/26/FA
3.	3.1	Joint Venture is not Applicable
4.	4.1	Ineligible country(s) are [<i>as per Section IV of the Bidding Documents</i>]
5.	4.5	Demonstration of authorization by manufacturer: Not Applicable
2. BIDDING DOCUMENTS		
6.	7.2	The number of documents to be completed and returned/uploaded through EPADS. Each page duly signed and stamped.
7.	8.1	Clarification can be obtained through EPADS.

	8.5	a) Pre-Bid meeting will be held both in person/physical and via Zoom on May 7, 2026, at 10:00 AM in PSPC Roomi Hall located at Head Office, Pakistan Security Printing Corporation (Pvt.) Ltd., Jinnah Avenue, Malir Halt, Karachi, Pakistan. A Zoom session will be arranged for those who wish to attend virtually. b) To participate in the pre-bid meeting, potential bidders are requested to send the following details to furqan.awan@pspc.gov.pk at least one day prior to the meeting for entry permission. A Zoom link will be shared upon request sent to the same email address. a) <i>Name of Participant</i> b) <i>CNIC No.</i> c) <i>CNIC Issuance Date</i> d) <i>Vehicle No.</i> e) <i>Company</i>
	9.2	In case of any corrigendum/ Addendum, the PSPC shall promptly publish at the PPRA web page/printing media before the bid opening date.
3. PREPARATION OF BIDS		
1.	11.1 (h)	In addition to the documents stated in ITB 11, the following documents must be included with the Bid a) Affidavit for Bidder's Blacklisting Status b) Declaration for Beneficial Ownership c) NDA
2.	12.3 (c)	Other procurement specific documentation requirements are Not applicable .
3.	12.4	The Bidder shall be required to provide an undertaking that they will ensure to supply spare parts as per BOQ / Technical Specification. In case of up gradation or modification in software or spare parts, Supplier will notify the Procuring Agency in advance for technological upgrades.
4.	13.3 (b)	The eligibility and qualification criteria required from Bidders in ITB 13.3(b) is modified as follows: a) As per criteria mentioned in (Invitation of Bids) Section -I of this document b) As per BOQ mentioned in (Schedule of Requirements, Technical Specifications) Section – V of this document
5.	15.7 (a) (i)	For goods manufactured or delivered from within Pakistan the price quoted shall be on a Delivered Duty Paid (DDP) basis, inclusive of all taxes, stamps, duties, levies, fees, transportation, insurance, incidental services imposed till the delivery location specified in the Schedule of Requirements. No separate payment shall be made for the incidental services to delivery of the goods to their final destination i.e. Procuring Agency's

		Site(s).
6.	15.6 (b)	For goods offered from abroad the price quoted shall be: PKR
7.	15.8	The price shall be fixed.
8.	16.1 (a)	For goods and related services originating or delivering within Pakistan, the currency of the Bid shall be Pakistan Rupee . For goods and related services that the Bidder will deliver from outside Pakistan: Not Applicable
9.	17.1	The Bid Validity period shall be 120 days.
10.	18.1	The amount of Bid Security shall be Rs. 4000,000/- The currency of the Bid Security shall be: Pakistan Rupee
11.	18.3	a) The Bid Security shall be in favor of Procuring Agency in the form of <i>either Payment Order/Bank Draft or an unconditional Bank Guarantee enforceable in Pakistan</i>
12.	18.3 (c)	Another Security: Not Applicable .
13.	18.6	The bidder must ensure that financial instrument pertaining to Bid Security must be uploaded through EPADS and original bid security must be submitted at PSPC defined address before the submission deadline. Non - compliance of this clause will lead to rejection of bid then & there.
14.	19.1	Alternative Bids to the requirements of the Bidding Documents will not be permitted.
15.	21.1	The number of copies of the Bid to be completed and returned shall be None .
16.	21.2	Duly notarized Power of Attorney authorizing the signatory of the Bidder to submit the Bid.
17.	21.2	Written confirmation of authorization to be provided by the bidder.
18.	11.1 (h)	In addition to the documents stated in ITB 11 , the following documents must be included with the Bid (Not applicable)
19.	12.3 (c)	Other procurement specific documentation requirements are given in BOQ/Technical Specifications (Section – V) .
4. SUBMISSION OF BIDS		
20.	22.2 (a)	Electronic bids prepared in accordance with the instruction provided in tender document must be submitted by using EPADS. On or before May 21, 2026 11:00 A.M. Manual bids will not be accepted. The e-bids will be opened on the same day at 11:30 A.M. by using EPADS.
21.	22.2 (b)	Title of the subject Procurement or Project name: <i>Hiring of Services for construction of PSPC Main Gate (N1) along with reception</i>

		<i>building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment</i> ITB title and No: <i>LP/T-4110/26/FA</i>
22.	23.1	The deadline for Bid submission on EPADS is: May 21, 2026 11:00 A.M.
5. OPENING AND EVALUATION OF BIDS		
23.	26.1	The Bid opening shall take place at: Bids will be opened at May 21, 2026 11:30 A.M. using EPADS in presence of the bidder(s), who desire to attend. Conditional / incomplete bid document will not be considered. In case of any unforeseen reasons, unrest or force majeure, which may cause delay on the bid opening date, the bids shall be opened on the next working day at the same place and time.
24.	26.6	The opening date of Financial Proposal will be communicated to the eligible bidders by the Procuring Agency.
25.	27	Information relating to evaluation of bids and recommendations concerning to award of the contract shall not be disclosed by the Procuring Agency to the bidders or to any other person who is not officially concerned with the process, until the announcement of the result of evaluation. The Bidder shall not disclose or attempt to make public any information relating to the bidding documents, bidding process and award of the contract to any person or entity without the Procuring Agency's prior written consent. In case of any disclosure related to the bidding process and contractual obligations at any stage by any bidder, the Procuring Agency may reject its bid and/or terminate the contract.
26.	32.2	The currency that shall be used for Bid evaluation and comparison purposes is: Pakistani Rupees.
27.	22.2 (a)	To be submitted using EPADS on or before deadline.
28.	33.4 (h)	Other specific criteria are Not applicable

29.	33.5 (b)	Delivery schedule: The goods covered under this invitation are required to be delivered (shipped) within an acceptable range of weeks specified in the Schedule of Requirement. No credit will be given to earlier deliveries, and Bids offering delivery beyond this range will be treated as non-responsive.
30.	33.5 (c) (ii)	Deviation in payment schedule is Not Applicable .
31.	33.5 (d)	Cost of spare parts. (Not applicable)
32.	33.5(e)	Spare parts and after sales service facilities in Pakistan. The Bidder shall be required to provide an undertaking that they will ensure to Complete Supply & Services as per BOQ / Technical Specification. (Not applicable)
33.	33.5 (f)	Operating and maintenance costs. As per BOQ (Not applicable)
34.	33.5 (g)	Performance and productivity of Equipment Items offered shall have a minimum productivity specified under the relevant provision to be considered responsive as specified in the Technical Specifications.
35.	33.5 (h)	Specific additional criteria to be used in the evaluation and their evaluation method or reference to the Technical Specifications is Not Applicable .
36.	33.6	In case of award to a single Bidder of multiple lots; the methodology of evaluation to determine the lowest evaluated Lot combinations, including any discounts offered in the Form of Bid is: - Bidder(s) shall submit bid for Complete Requirement, evaluation of bids and award of contract(s) will be made for the Complete Requirement as specified in bid evaluation criteria.
37.	34.1	Domestic preference Not Applicable .
38.	35	Quality and Cost Based Selection (QCBS) In such combination, there shall be some specific weightage of both the technical features (such as prescribed in ITB 35.2) and financial aspects of the proposal. The financial marks shall be awarded on the basis of inverse proportion calculations. The highest ranked bid shall be declared, on the basis of combined evaluation. A. EVALUATION CRITERIA of QCBS Technical Evaluation (weightage) 70%

Financial Evaluation (weightage) 30%

19. TECHNICAL EVALUATION CRITERIA (TOTAL: 70 MARKS)

Minimum Qualifying Score: 49 Marks (70%)

**19.1 Company Experience (Completed Projects)– 16 Marks
(Minimum 1x Project is mandatory)**

Criteria	Marks
4x Completed Projects of same nature ≥ PKR 250M (last 7 years)	16
3x Completed Projects of same nature ≥ PKR 250M (last 7 years)	12
2x Completed Projects of same nature ≥ PKR 250M (last 7 years)	8
1x Completed Project of same nature ≥ PKR 250M (last 7 years)	4

19.2 Company Experience (Ongoing Projects) – 4 Marks

Criteria	Marks
2x ongoing Projects of same nature ≥ PKR 250M	2
1x ongoing Project of same nature ≥ PKR 250M	2

19.3 Client Feedback – 6 Marks (1 x mark for each project, client feedback will be obtained of projects mentioned in para 19.1 & 19.2 and marks will be awarded accordingly)

Marks based on:

- Satisfactory Performance/Feedback Letters/emails

**19.4 Specialized Security Systems Experience – 15 Marks
(Minimum 1x Project is mandatory)**

Criteria	Marks
3x Integrated Security Projects (Integration of Vehicle Access Control and Pedestrian Access Control System) ≥ PKR 50M) - last 10 years	15
2x Integrated Security Projects (Integration of Vehicle Access Control and Pedestrian Access Control System ≥ PKR 50M) - last 10 years	10
1x Integrated Security Project ≥ PKR 50M (Integration of Vehicle Access Control and Pedestrian Access Control System) - last 10	5

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		Final Score = Technical Score + Financial Score Contract shall be awarded to the bidder securing the highest combined score The most advantageous evaluated responsive bid as per our BOQ / Specification / Sample and meeting all other terms & conditions of bid documents.
6. AWARD OF CONTRACT		
39.	40.1	Percentage for quantity increase or decrease is 15% .
40.	41	Letter of acceptance may please be read as Purchase Order.
41.	43.2	i) The Performance Guarantee shall be in the form of an unconditional Bank Guarantee enforceable in Pakistan, or insurance guarantee (<i>PACRA Rating "AAA, AA++"</i>) or as per Performance Guarantee form specified in the Bidding Documents. The guarantee must be valid for a period exceeding 28 days after completion of contract. ii) the bidder will submit the performance guarantee of within 10 days of the issuance of Letter of Intent.
42.	44.1 & 44.2	Not Applicable
43.	45.1	In case of any dispute and difference which may arise in connection with the execution of the contract, the matter shall be referred to Managing Director of Corporation, who shall take decision in the matter. In case the dispute remains unresolved, the matter will be resolved through arbitration as per the Arbitration Act, 1940.
7. REVIEW OF PROCUREMENT DECISIONS		
44.	48.1	The address of the Procuring Agency Chairman/Convenor (Grievance Redressal Committee) Pakistan Security Printing Corporation (Pvt.) Ltd Jinnah Avenue, Malir Halt, Karachi – Pakistan Email address of convenor: Inayat.rahman@pspc.gov.pk Please note that, in addition to EPADS, submission of the grievance to the above-mentioned email address is also mandatory
	48.6	The Address of PPRA to submit a copy of grievance: Grievance Redressal Appellate Committee, Public Procurement Regulatory Authority 1st Floor, G-5/2, Islamabad, Pakistan Tel: +92-51-9202254

SECTION IV: ELIGIBLE COUNTRIES

All the bidders are allowed to participate in the subject procurement without regard to nationality, except bidders of some nationality, prohibited in accordance with policy of the Federal Government.

Following countries are ineligible to participate in the procurement process:

1. India
2. Israel

Ministry of Interior, Government of Pakistan has notified List of Business-Friendly Countries (BVL). Information can be accessed through following link:

<http://www.dgip.gov.pk/Files/Visa%20Categories.aspx#L>

SECTION V: SCHEDULE OF REQUIREMENTS, TECHNICAL SPECIFICATIONS

Technical Specifications

1. **Scope of Project and Requirements:**

The Pakistan Security Printing Corporation (Pvt.) Ltd intends to procure

Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment

1.1. **Delivery:**

Delivery will be considered accomplished when offered Items will be delivered at Procuring Agency's site i.e. respective department as per schedule of requirement or as above mentioned BOQ.

1.2. **Installation (if any):**

Installation will be considered accomplished when offered Items will be installed at Procuring Agency's site i.e. respective Pakistan Security Printing Corporation (Pvt.) Ltd as per requirement specified in BOQ.

1.3. **Integration (if any):**

Integration means that all the necessary configuration of the offered Items is according to the Procuring Agency's requirement and ready for the use.

1.4. **Operational Acceptance (if any):**

Operational Acceptance means that the offered machine has been installed, configured, integrated and operational after testing in accordance with the standard procedure provided by the OEM.

1.5. **Training & Documentation (if any):**

The bidder will provide formal hands on training and documentation as specified in BOQ.

1.6. **Factory Acceptance Test & Site Acceptance Test (if any):**

The bidder will provide FAT & SAT as specified in BOQ.

Terms & Conditions and BOQ



HIRING OF SERVICES FOR CONSTRUCTION OF PSPC MAIN GATE (N1)

along with Reception Building; Allied Road Works, Civil Works, MEP Works and Supply & Installation of Security Equipment

1. INTRODUCTION

1.1 PSPC intends to engage a professionally qualified, technically competent, and financially sound contractor for execution of the subject project on a turnkey basis. The contractor shall be responsible for complete execution of the works in accordance with the approved drawings, specifications, and Bill of Quantities (BOQ).

1.2 The design, detailed drawings, structural design, MEP layouts, security system layouts, and BOQ have already been prepared by the appointed Consultant. The selected contractor shall execute the project strictly in accordance with these approved documents without deviation unless formally approved in writing by the Consultant and PSPC.

1.3 The entire project shall be executed under the top supervision, technical monitoring, inspection, and certification of the appointed Consultant and PSPC. All shop drawings, material submittals, method statements, inspections, and testing shall be submitted for Client and Consultant review and approval prior to execution.

1.4 The contract shall be awarded through competitive bidding in accordance with applicable PPRA rules and prevailing procurement regulations.

2. REGULATORY & STATUTORY COMPLIANCE

2.1 The bidder must hold valid registration with Pakistan Engineering Council (PEC) in Category C-3 or above, valid for the current year, along with relevant specialization codes as specified under Section 19.6 of this document.

2.2 The bidder must possess valid National Tax Number (NTN), General Sales Tax (GST) registration, and Active Taxpayer Status. Where applicable, the bidder must also be registered with

SECP.

2.3 The bidder must not be blacklisted by any public or private organization. An affidavit confirming non-blacklisting and disclosure of any ongoing litigation shall be submitted with the bid.

2.4 Failure to comply with statutory and regulatory requirements shall result in rejection of the bid.

3. SCOPE OF WORK

The scope of work shall include complete execution of civil, MEP, and security works strictly in accordance with the Consultant-prepared drawings and BOQ.

3.1 Civil Works

The civil works shall include construction of the Main Gate (N1) structure, Reception Building (G+1), boundary walls, guard areas, internal roads, paved areas, drainage systems, foundations for security equipment, and all associated structural and architectural components. The contractor shall execute all earthworks, structural concrete works, masonry, plastering, finishing works, flooring, painting, and external development required to complete the facility in all respects.

All civil works shall be carried out as per approved structural drawings, Client and Consultant instructions, and applicable standards.

3.2 MEP Works

The MEP scope shall include complete electrical distribution systems, internal and external lighting, earthing and grounding systems, power supply infrastructure for security systems, HVAC systems for the Reception Building and associated areas, and low voltage systems. All installations shall be executed in accordance with approved drawings and relevant electrical and mechanical standards.

3.3 Security Systems (Supply, Installation and Integration)

The contractor shall supply, install, configure, test, commission, and integrate all security equipment as per approved BOQ and Consultant design. This includes Entry/Exit Management Security Equipment, CCTV Surveillance System, Access Control System, structured cabling, network infrastructure, control room setup, and complete integration of all systems.

The contractor shall ensure that all systems operate in an integrated environment and demonstrate complete functionality prior to final handover.

3.4 Allied Works

The contractor shall execute all allied and enabling works necessary for operational readiness, including traffic management infrastructure, trenching, ducting, reinstatement, cable routing, and final finishing works required for full system functionality.

4. PROJECT DELIVERY REQUIREMENTS

4.1 The contractor shall prepare and submit shop drawings, coordinated drawings, method

statements, and material submittals for approval prior to execution.

4.2 The contractor shall coordinate civil, MEP, and security works to ensure smooth execution without delays or conflicts.

4.3 The contractor shall deliver a fully functional facility including testing, commissioning, documentation, and training of PSPC staff before final handover.

5. MANDATORY ELIGIBILITY CRITERIA (PASS / FAIL BASIS)

Non-compliance with any of the following shall result in disqualification:

5.1 The bidder must possess minimum ten (10) years of relevant construction experience in similar nature projects.

5.2 Valid PEC Registration - Category C-3 or Above.

5.3 Valid NTN, GST Registration and Active Taxpayer Status.

5.4 Affidavit of Non-Blacklisting and Litigation Disclosure.

5.5 Submission of Bid Security in prescribed form.

5.6 Signed Acceptance of BOQ, Drawings, and Tender Conditions by the bidder.

5.7 Submission of Valid Project-Specific OEM Authorization Certificate for all quoted Security Equipment.

5.8 Submission of Complete Technical Submittals and Data Sheets.

5.9 Mandatory Pre-Bid Meeting Attendance.

5.10 Mandatory Site Visit verified through PSPC Entry Approval Log.

5.11 Audited Financial Statements (Last 3 Years) and should be submitted along with the technical bid

5.6 OEM Authorization Requirement

The bidder shall submit a valid project-specific OEM Authorization Certificate clearly mentioning the project name and tender number. The authorization must be issued by the OEM or its officially authorized distributor. PSPC reserves the right to verify the authenticity of such authorization directly with the issuing authority. Any false or unverifiable authorization shall result in immediate disqualification.

5.7 Technical Submittals Requirement

The bidder shall submit complete technical documentation including detailed data sheets, technical catalogues, model numbers, country of origin, and warranty details for all quoted items. Incomplete technical documentation shall render the bid non-responsive.

6. CONTRACTOR EXPERIENCE

6.1 The bidder must possess minimum ten (10) years of relevant construction experience in similar nature projects.

6.2 The bidder shall submit documentary evidence including completion certificates, work orders/purchase orders, issued by clients as per the details mentioned in the evaluation criteria

below

7. SITE VISIT & PRE-BID MEETING

Attendance in the pre-bid meeting and site visit is mandatory. Verification shall be carried out through the PSPC Entry Approval Log and signed attendance sheet. Bidders failing to attend shall be declared non-responsive.

8. PROJECT PLANNING & TIMELINE

The project completion period shall be twelve (12) months from issuance of Purchase Order. A kick-off meeting shall be held within ten (10) working days of award. Within fourteen (14) days of award, the contractor shall submit a detailed baseline schedule, resource deployment plan, shop drawings, and material submittals for Client and Consultant approval.

9. MATERIAL INSPECTION & QUALITY ASSURANCE

All materials shall be subject to inspection and approval by the Consultant and PSPC prior to installation. Only brand-new and unused equipment shall be permitted. Any material found non-compliant shall be rejected and replaced at contractor's cost.

10. INSTALLATION STANDARDS

All works shall comply with OEM specifications, IEEE 802.3 standards for networking systems, ISO 45001 safety requirements, PEC Standard Conditions of Contract, and applicable local regulations.

11. WARRANTY & DEFECT LIABILITY

The contractor shall provide a Defect Liability Period of twelve (12) months from the date of final handover for all civil and MEP works.

All supplied and installed security equipment shall carry a minimum warranty of one (01) year from the date of final inspection by the client. During the warranty period, the contractor shall be responsible for rectification of defects, repair, replacement of faulty components, software configuration issues, and restoration of system functionality without any additional cost to PSPC.

12. TESTING & COMMISSIONING

The contractor shall carry out SAT of the Vehicle Access Control System (VACS) and Pedestrian Access Control System (PACS) as per the OEM protocols, integrated system testing, and final operational demonstration in the presence of the Consultant and PSPC representatives prior to issuance of completion certificate as per the below protocol:

The Contractor shall perform a comprehensive Site Acceptance Test (SAT) for all supplied Vehicle Access Control System (VACS) and Pedestrian Access Control System (PACS) equipment. The SAT shall be executed strictly in accordance with the OEM's test procedures, specifications, and acceptance criteria.

SAT Documentation

Prior to commencing the SAT, the Contractor shall submit for review and approval:

- The OEM's formal SAT procedure and checklist for both VACS and PACS.
- OEM-recommended test equipment, calibration certificates, and test software.
- Proposed SAT schedule and resource allocation plan.
- Pass/fail criteria as defined by the OEM.

Pre-SAT Conditions

SAT shall only commence after:

- All VACS and PACS equipment are permanently installed, terminated, and powered as per final approved drawings.
- The site environmental and network conditions meet OEM-specified operational thresholds.

Test Witnessing & Records

- The procuring agency and/or their representative reserves the right to witness all of the SAT.
- The Contractor shall provide real-time logging of all test results using OEM-approved tools.
- A complete SAT report, signed by the Contractor's authorized representative, shall be submitted within 7 days of test completion.

Acceptance Criteria

The VACS and PACS shall be considered SAT-passed only when:

- All test cases defined in the OEM's SAT procedure are executed successfully (100% pass rate for all safety/security functions).
- No unresolved deviations from OEM specifications exist.
- The OEM's SAT sign-off certificate is obtained and submitted.

Re-testing in Case of Failure

If any equipment or subsystem fails the SAT, the Contractor shall:

- Rectify the root cause at no additional cost or time extension.
- Repeat the full SAT or the failed subset as directed by the procuring agency following the same OEM procedure.
- Bear all costs for re-testing including any third-party witnessing fees.

13. DOCUMENTATION & TRAINING

The contractor shall provide complete documentation including IFC drawings, as-built drawings, operation and maintenance manuals, system configuration files, warranty certificates, and training to designated PSPC staff for operation and maintenance of all installed systems.

14. SITE MANAGEMENT & SAFETY

The contractor shall be fully responsible for site safety, labor supervision, compliance with occupational health and safety regulations, and provision of personal protective equipment. Proper hard barricading, signage, and access control shall be maintained throughout the project duration.

15. RESPONSIBILITY & DAMAGE LIABILITY

The contractor shall remain responsible for all materials, tools, and equipment at site. Any damage caused to existing infrastructure, utilities, or any other property of the procuring agency or third-party property during execution shall be repaired or reinstated at contractor's cost.

16. PAYMENT TERMS

Payments shall be made through milestone-based Interim Payment Certificates (IPCs) at 20%, 40%, 60%, 80%, and 100% completion stages as verified by the Consultant and PSPC.

Fifteen percent (15%) advance may be released against submission of an AAA/AA+ rated Bank or Insurance Guarantee. Advance payment shall be subject to proportionate deduction from first four IPCs and shall be fully settled at 80% completion milestone.

All payments shall be subject to joint measurement and certification.

17. LIQUIDATED DAMAGES

In case of delay beyond the stipulated completion period, liquidated damages shall be imposed in accordance with PPRA rules and contract conditions.

18. CLIENT RIGHTS

PSPC reserves the right to accept or reject any bid, verify submitted documents, seek clarifications, cancel the tender process at any stage

19. TECHNICAL EVALUATION CRITERIA (TOTAL: 70 MARKS)

Minimum Qualifying Score: 49 Marks (70%)

19.1 Company Experience (Completed Projects)– 16 Marks (Minimum 1x Project is mandatory)

Criteria	Marks
4x Completed Projects of same nature ≥ PKR 250M (last 7 years)	16
3x Completed Projects of same nature ≥ PKR 250M (last 7 years)	12
2x Completed Projects of same nature ≥ PKR 250M (last 7 years)	8
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19.2 Company Experience (Ongoing Projects) – 4 Marks

Criteria	Marks
2x ongoing Projects of same nature ≥ PKR 250M	2
1x ongoing Project of same nature ≥ PKR 250M	2

19.3 Client Feedback – 6 Marks (1 x mark for each project, client feedback will be obtained of projects mentioned in para 19.1 & 19.2 and marks will be awarded accordingly)

Marks based on:

- Satisfactory Performance/Feedback Letters/emails

19.4 Specialized Security Systems Experience – 15 Marks (Minimum 1x Project is mandatory)

Criteria	Marks
3x Integrated Security Projects (Integration of Vehicle Access Control and Pedestrian Access Control System) ≥ PKR 50M) - last 10 years	15
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1x Integrated Security Project ≥ PKR 50M (Integration of Vehicle Access Control and Pedestrian Access Control System) - last 10 years	5

19.5 Financial Strength – 10 Marks (Minimum 300 million is mandatory)

Criteria	Marks
Avg Annual Turnover of Last 3 years ≥ PKR 500M	10
Avg Annual Turnover of Last 3 years ≥ PKR 350M	7
Avg Annual Turnover of Last 3 years ≥ PKR 300M	5

19.6 Key Technical Personnel – 15 Marks (Minimum 1x Civil and 1x Electrical Engineer is mandatory with 7 years of experience)

Position	Requirement	Marks	Remarks
Project Manager	BE Civil (10+ yrs.)	4	
Civil Engineer	BE Civil (7+ yrs.)	3	
Electrical Engineer	BE Electrical (7+ yrs.)	3	
OEM Authorized Engineer	BE Electronic/IT (OEM Trained) (5+ yrs.)	3	For installation of security equipment's
MEP Engineer	BE Mechanical (7+ yrs.)	2	

19.7 PEC SPECIALIZATION CODES – 4 MARKS

PEC Code	Description	Marks
CE-01 / CE-10	Roads & Structures	1
EE-02	Safety/Security/Surveillance	1
EE-03	Electrical Works	1
EE-04	Communication / LV	1

20. FINANCIAL EVALUATION – 30 MARKS

Only technically qualified bidders (≥49 Marks) shall proceed to financial evaluation.

Financial Score Formula:

Financial Score = (Lowest Bid / Quoted Bid) × 30

21. FINAL COMBINED SCORE

Final Score = Technical Score + Financial Score

Contract shall be awarded to the bidder securing the highest combined score

SUMMARY OF CONTENTS**DESCRIPTION**

1. CAST IN PLACE CONCRETE
 2. CEMENT PLASTER
 3. FLOORING
 4. GLASS & GLAZING
 5. PAINTING & POLISHING
 6. TERMITE PROOFING
 7. CARPENTRY & JOINERY
 8. HVAC APPROVED MANUFACTURE LIST
 9. PLUMBING APPROVED MANUFACTURE LIST
 10. ELECTRICAL SPECIFICATION
 11. BILL OF QUANTITIE
-

CAST-IN-PLACE CONCRETE

1. SCOPE.

This section covers the manufacturing, forming, transporting, placing, stripping of forms, finishing and curing of plain and reinforced concrete in the structures included herein.

2. APPLICABLE STANDARDS.

Concrete work shall conform to all requirements of ACI 310-72, Specifications for structural concrete for Building, except as modified by supplemental requirements below. The Contractor shall submit, for the approval of the Engineer, before commencement of any work, his Method Statement which would provide complete details of the procedures and equipment to be used for the satisfactory execution of the work. The approval of such Method Statement shall not relieve the Contractor of his responsibility under the Contract.

- 2.1 Composition and quality :** Concrete shall be composed of Portland cement, water, fine and coarse aggregate and any admixtures as and when specified. The concrete mixtures shall be designed by the Contractor and will be subject to the approval of Engineer who will determine the required quality of the concrete for the structures covered by these Specifications. The desired strengths of concrete for various parts of the Project have been shown on the Drawings. Portland Cement shall conform to the Specifications and requirements set-forth in the item Portland Cement.

3. MATERIALS

3.1 CEMENT

- 3.1.1 All cement, unless otherwise stated, shall be normal setting ordinary Portland cement of an approved brand conforming to the tests and requirements of British Standard Specifications BSS 12: 1958 or equivalent.
- 3.1.2 The cement shall be delivered to the site in the original sealed and branded bags or containers of the manufacturer. The Contractor shall provide, at his own cost, an area allocated to him at site, all necessary sheds for storage of cement, off the ground, in covered water tight space in a manner approved by the Consultant / Engineer. Each batch delivered shall be stacked separately and used in order of delivery.
- 3.1.3 The cement shall be subject, from time to time, to such tests as the Consultant / Engineer may direct at the place of manufacture or on site. All samples shall be provided by the Contractor at his own cost and cost of all tests shall be borne by the Contractor.
- 3.1.4 If at any time the Consultant / Engineer consider that any batch of cement may have deteriorated on site during storage for any reason, he will direct that tests shall be made and the batch of cement on site which may be in question, shall not be used until it has been shown by test to be satisfactory. Any rejected cement shall be removed from the site by the Contractor without delay. Cement reclaimed from clearing bags or leaking containers shall not be used.
- 3.1.5 Mixing of various types and brand of cement shall not be permitted.
-

3.2 AGGREGATES.

- 3.2.1 **General** : Aggregates for normal concrete shall conform to ASTM Designation C33-74, Petrographic examination in accordance with ASTM C295-65 shall be performed to determine the suitability of the aggregates for the intended use. The nominal maximum size of the aggregate shall not be larger than one-fifth of the narrowest dimension of the finished wall or slab, or larger than three fourths of the minimum clear spacing between reinforcing steel and embedment. These limitations may be waived if, in the judgment of the Engineer, workability and methods of consolidation be such that the concrete can be placed without honey combing or voids.
- 3.2.2 **Composition** : The use of natural sand or a combination of natural and manufactured sands may be permitted provided that the fine aggregate meets the applicable requirements of the Specifications herein for particular use intended. Coarse aggregate shall consist of gravel or crushed gravel or a combination thereof.
- 3.2.3 **Source** : The Contractor shall obtain concrete aggregates from deposits of natural sand and gravel or shall produce crushed aggregate from approved deposits. The Contractor shall be responsible for obtaining all necessary rights and permits and for ascertaining the extent of work including type of equipment requirement and amount of waste involved in producing a sufficient quantity of acceptable aggregate from the source finally selected by him and approved by the Engineer. The Contractor may alternatively obtain the aggregate from any of the queries which produce the aggregate meeting with the Specifications contained herein as approved by the Engineer.
- 3.2.4 **Sampling and Testing**: During construction, aggregates will be sampled as delivered to the mixer to determine compliance with Specifications provisions. The Contractor shall provide facilities as may be necessary for the ready collection or representative test samples. The Engineer will obtain and test such samples, using appropriate standard test methods. Testing of concrete aggregates by the Engineer shall not relieve the Contractor of his responsibility to maintain control, to ensure the production, stockpiling and handling of both fine and coarse aggregate in accordance with these specifications. Materials and installed work may require testing as directed by the Engineer at any time during the process of the work. The Contractor will pay for all these sampling and tests. No extra payment will be made for this item. The cost thereof, shall be deemed to have been included in the relevant items in the Bill of Quantities.
- 3.2.5 **Processed Aggregates** : Aggregates, as delivered to the mixer shall consist of clean, hard and un-coated particles. Lightweight elements (chalk, clay, coal) will be separated by segregation under water by vibration (vibro-floatation process). Where required, fines shall be removed from the coarse aggregate by adequate washing. The coarse aggregate shall be re-screened just prior to delivery to the concrete mixing machine, loading hopper. The moisture content shall conform to the provisions in compliance with the aggregate grading and
-

uniformity requirements shall be determined at the mixer. All aggregate shall be sieved and washed with clean water. The aggregates shall conform to the following requirements.

3.2.5.1 **Fine Aggregates** : The grading and uniformity of fine aggregates as delivered to the mixers shall conform to ASTM C33-74 Standard.

Sieve Designation U.S. Standard Square Mesh		Percent Passing
3/8 inch	(9.5mm)	100
No. 4	(4.75mm)	95 to 100
No. 8	(2.36mm)	80 to 100
No. 16	(1.18mm)	50 to 85
No. 30	(600 um)	25 to 60
Nos. 50	(300 um)	10 to 30
No. 100	(150 um)	2 to 10

The fineness Modulus shall range between 2.31 and 2.51.

3.2.5.2 **Coarse Aggregates:** The grading of the coarse aggregates with the separated size groups shall conform to the following requirements as delivered to the mixer.

U.S. Standard Sieve Size (Nominal Size)		Amount finer than each lab. Sieve (square opening) weight percent		
		¾ inch to No. 4 group (10.0 to 4.75) mm mm		
3 inches	(75 mm)	-		-
2½ inches	(63 mm)	-		-
2 inches	(50 mm)	-		-
1½ inches	(37.5 mm)	-		-
1 inch	(25.0 mm)	100	To	
¾ inch	(19.0 mm)	90	To	100
3/8 inch	(9.5 mm)	20	To	55
No.4	(4.75 mm)	0	To	10
No.8	(2.36 mm)	0	To	5

3.3 WATER

Water for washing aggregates and for mixing and curing concrete shall be clean and free from injurious amounts of oil, acid, alkali, salt, organic matter, or other deleterious substances as determined by standard tests selected by the Engineer. It shall meet the following chemical requirements.

Chlorides such as sodium chloride	max.	3000
ppm Sulphate such as sodium sulphate	max.	2000
ppm Impurities	max.	
2gm/litres		
Melted salt	max.	15gm/litres

The water for curing concrete should not have pH value lower than 4 and shall not contain impurities which cause discoloration of concrete.

4 CONCRETE.

4.1 **Proportioning** : The proportions of all materials entering into the concrete shall be as directed by the Engineer. The proportions will be changed whenever such change is necessary to maintain the standard of quality

required for the structures covered by these specifications and to meet the varying conditions encountered during construction. The contractor will be entitled to no

compensation additional to that included in the prices for the applicable tender items in the Bill of Quantities because of such changes.

- 4.2 All materials entering into the concrete shall be measured by weight or by volume as approved by the Engineer.
- 4.3 The cement content of concrete for various parts of the structure shall be established by trial mixes depending on the structural equipment, water cement ratio, size type and gradation of aggregate used. If at a particular place there is so large quantity of steel that it becomes difficult to get the concrete well around and between it, then the specified batch of the concrete consisting of smaller size of aggregate and increased quantity of cement shall be used as instructed by the Engineer so as to achieve the same strength as for normal concrete. As a general guideline, the cement content for various parts of structure will range from an approximate minimum of 12 bags to an approximate maximum 22.5 bags weighing 50 kilos each per 2.83 Cu. Meters (100 cft.) of Cement Concrete or as approved / determined by the Engineer.
- 4.4 **Aggregate Content :** The maximum size of aggregate to be used in the various parts of the structure shall be as shown on the drawings and where not shown, shall be as directed by the Engineer. Concrete mixes shall be designed to use the largest size and maximum amount of coarse aggregate practicable in accordance with the related Specifications.
- 4.5 **Water Cement Ratio :** In general, the Contractor's submitted mix design will provide for water cement ratio by weight (exclusive of water absorbed by the aggregates), which will be determined on the basis of producing concrete having suitable workability, density impermeability, durability, and the required strength without the use of excessive amounts of cement. The concrete work will commence only after the approval of the mix design by the Engineer.
- 4.6 **Consistency :** The amount of water used in concrete will be regulated as required by the Engineer to secure concrete of proper consistency taking into account the effect of use of the specified admixtures and any variation in either or both the moisture content or grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.
- 4.7 **Concrete Strength :** Concrete for the several structures and parts thereof shall have compressive strengths at least equal to the minimum allowable strengths shown in the following table except as otherwise shown on the Drawings or directed by the Engineer. The Contractor will prepare design mixes of each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI-301. If trial batch method used, use an independent testing facility acceptable to the Engineer for preparing and reporting proposed mix design.

The compressing strength for all types of concrete shall not be less than the minimum requirements given below.

Class / Nominal Mix By Volume	Minimum Compressive Cube Strength (In lbs./psi)	
	7 Days	28 Days
A 1:1:2	3000	4500
B 1:1½:3	2500	3750
C 1:2:4	2000	3000
D 1:3:6	1400	2100
E 1:4:8	1000	1500

- 4.8 **Slump :** In general, the slump of the concrete, after concrete has been deposited but before it has been consolidated shall not exceed the values specified below for the structures and/or parts thereof unless otherwise directed by the Engineer. Check slumps shall be taken at the Concrete mixer platform and at other locations as directed by the Engineer. The Engineer may order the placement of concrete having a lesser slump can be consolidated readily into place by means of the specified vibration. The use of buckets, chutes, hoppers or other equipment of types that will not readily handle and place concrete of such lesser slump will not be permitted. The slump will be determined in accordance with ASTM Designation C-143-74, Standard Method of Test for Slump for Portland Cement Concrete.

Concrete Uses

Slump

Beams, slabs, floors and foundations 50mm (2") to 75mm

(3"). Walls, columns, parapets, kerbs, etc. 75mm (3") to 100mm

(4").

- 4.9 **Compaction Factor :** In order to maintain frequent checking of concrete consistency as an index to workability and uniformity of concrete mixing machine, slump tests may be supplemented by compaction factor tests at such intervals as may be directed by the Engineer. The compaction factor tests will be made near the concrete mixing machine platform and will not be more frequent than the total number of times of check slump tests at concrete mixing yard and accompanying slump tests for casting control cylinders for concrete strength tests. The Contractor shall assist the Engineer to make such tests. The method to determine the compaction factor shall conform to the requirement of ACI Code Practice related to compaction factor.

4.10 **Strength Test During The Work:**

4.10.1 **Test of Concrete :** Strength tests of the concrete placed during the course of the work will be performed under the direction of Engineer and at the expenses of Contractor and shall be done in a laboratory as approved by the Consultant. The Contractor shall assist the Structure Engineer in obtaining, for control purposes, such number of cylinders as the Engineer may direct, but in general three sets of three cylinders and/or three sets of three beams, taken from each 10 cubic metres or fraction thereof or from each day's pour, whichever is less, of each class of concrete placed. Test specimens will be made and cured by the Engineer in accordance with the applicable requirements of ASTM

Designation C31-69, Standard Method of Making and Curing Concrete Compressive and Flexural Test Specimens in the Field. Cylinders and beams will be tested by the Engineer in accordance with the applicable requirements of ASTM Designation C39-72, Standard Method of Test for compressive strength of cylindrical concrete specimens and ASTM Designation C78-64, standard method of test for Flexural strength of concrete (using simple Beam with third point loading). The test result will be based on the average of the strength of the test specimens except that if one specimen in a test of three shows manifest evidence of improper sampling, molding, or testing, the test result will be based on the average of the remaining two specimens. If two specimens in set of three show such defects, the results of the set will be discarded and average strength determined from test results of the other two sets. The standard age of test will be 28 days, but 7-days tests may be used at the discretion of the Engineer, based on the relation between the 7-days and

28 days strengths of the concrete as established by tests for the materials and proportions used. If the average of the strength tests of the specimens cured under laboratory controls, for any portion of the work, fails below the minimum allowable compressive or flexural strength at 28 days required for the class of concrete used in that portion, the Engineer may change the proportions of the constituents of the concrete, as necessary to secure the required strength for the remaining portion of the work. If the average strength of the specimens cured under actual field conditions, as specified herein before, falls below the minimum allowable strength, the Engineer will make such changes in the conditions for temperature and moisture under which the concrete work is being placed and cured as may be necessary to secure the required strength.

4.10.2 Tests of Hardened Concrete in or Removed From the Structure :

Where the results of the strength tests of control specimens indicate that the concrete as placed does not meet specifications requirements or where there is other evidence that the quality of the concrete is below specification requirements, core-boring tests will be made by the Engineer in accordance with the applicable requirements of obtaining and testing drilled cores and sawed beams of concrete. If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be immersed in water for at least 48 hours and tested wet. In the event that the core boring test indicates that the concrete placed does not conform to the drawings and specifications, measures as prescribed by the Engineer shall be taken to correct the deficiency. However, the Engineer shall have the authority to prescribe such corrective measures (and the contractor shall take such measures) if in the Engineer's opinion the results of the test specimens, without coring, warrant such action. An independent testing agency approved by the Engineer will perform all tests. The test may not be limited to core tests. Other non-destructive and load tests may be adopted if there is reasonable doubt that the specified concrete strengths and other characteristics have not been obtained in the structures or concrete. The Contractor shall pay for all such tests. The cost will be deemed to be included in the Contractor's Bill of Quantities' rates for Plain and Reinforced Concrete. If a strength or characteristic deficiency is found, the Contractor shall reserve all

work relating to such test failures and replace all faulty concrete with new concrete and reinforcement where specified and as directed by the Engineer. The Contractor shall pay for all such tests and replacing and redoing of all the faulty work. The Contractor shall also be responsible for any time loss due to these tests and replacement activities. Non-destructive tests may also be made to verify the in-situ strength of the concrete. The Contractor shall bear all expenses if the concrete is found to be below the required strength and quality.

4.10.3 Load Test of Structures : The Contractor shall carry out the load test at his own cost in the following manner if the Engineer is not satisfied with a part or whole of the structure to help the Engineer in determining the acceptability. This test will be carried out after the expiry of 56 days of effective hardening of the concrete. The structure will be subjected to superimposed load equal to 1.25 times the designed load and this load to be maintained for 24 hours. If within 24 hours of removal of load the structure does not show recovery of minimum of 75% of the deflection shown during the Test Period, the test loading will be repeated. The structure will be considered to have failed to pass the Test if the recovery after the second test is not at least 75% of the maximum deflection shown during the second Test. If during the test, or upon removal of load, the structure shows sign of weakness under deflection or faulty construction, cracks, it would be reconstructed or strengthened as necessary at the Contractor's Cost. If the test result is shown such that, in the opinion of the Engineer, the work meets the satisfaction, the actual cost will be borne by the Owner or the Employer.

4.11 Concrete Mixing and Delivery :

4.11.1 Type and Capacity : All concrete shall be produced by Concrete Mixing Machine. For the purpose, the contractor shall provide one or more concrete mixing machines having sufficient capacity to produce concrete at such a rate as will enable the completion of monolith pours in lift heights as shown on the drawings within acceptable time limits, and will assure the completion of concrete structures in accordance with the requirements of construction schedule. Hand-mixed concrete shall not be used, however, the Engineer may authorize the use of concrete mixed in small portable mechanical mixers for specific purposes. In the event of such a permission, the batching shall be carried out by using the dry-mix method. The batched materials shall be thoroughly combined into a uniform mixture before the addition of water. The water shall be added gradually and the mixer operated for adequate length of time so as to obtain a thoroughly mixed concrete of uniform color and quality.

4.11.2 Location : The concrete Mixing machine shall be installed at the site of the work at a location selected by the Contractor and approved by the Engineer.

4.11.3 Batching : All material shall be batched by volume. The volume measuring box shall be so constructed and arranged that sequence and timing of batcher discharge chute can be controlled to produce a ribboning and mixing of the aggregate and of the cement with the aggregate as the material pass through the hopper into mixer. The

concrete shall be received in following limits of accuracy.

Material

	<u>Percen</u>
‡ Cement	+ 1 %
Water	+ 1 %
Aggregate smaller than $\frac{3}{4}$ " (18.75 mm)	± 2 %

- 4.11.4 Adequate cooling facilities shall be provided to ensure that the temperature of concrete when discharged from the mixer is sufficiently low to meet the temperature requirements as specified in Clause 4.14.3.

Cooling mixing water, ice, pre-cooled aggregate or any other arrangement may be used to accomplish the pre-cooling of the concrete, subject to the approval of the Engineer but approval shall not in any way relieve the Contractor of his responsibility of placing concrete at temperatures at or below the specified limits.

- 4.11.5 **Volume Measurement :** Adequate facilities shall be provided by the Contractor for the accurate measurement and control of each of the materials entering each batch of concrete. The accuracy of the volume measurement boxes shall conform to the requirement of applicable standards selected by the Engineer for such equipment. The materials measurement boxes shall be arranged so that the Concrete mixing operator and Engineer can observe the counting of number of boxes dumped into the hopper.

- 4.11.6 **Water Batchers :** A suitable water measuring device shall be provided by the Contractor which will be capable of measuring water within the specified requirements for each batch. The mechanism for delivering water to the mixer shall be such that no leakage will occur.

- 4.11.7 **Mixers :** Suitable mixers shall be provided by the Contractor. Each mixer shall be capable of combining the materials into a uniform mixture and of discharging this mixture without segregation. Mixers shall not be charged in excess of the capacity recommended by the manufacturers and shall not be recharged before completely discharging the previous batches. Excessive over-mixing requiring additions of water will not be permitted. The mixers shall be operated at a drum speed designated by the manufacturer. The mixers shall be maintained in satisfactory operating condition and mixer drums shall be kept free of hardened concrete. Mixer blades shall be replaced when worn down more than 10 percent of their depth.

- 4.11.8 **Mixing Time :** The mixing periods specified below are predicted on proper control of the speed of rotation of the mixer and of the proper introduction of the materials into the mixer. The mixing time will be increased when such increase is necessary to secure the required uniformity and consistency of the concrete. The mixing time for each batch after solid materials are in the mixer drum, provided that all the mixing water is introduced before one-fourth of the mixing time has elapsed, shall be as follows:

Capacity of Mixer**Mixing Time**

0.25 to 1.52 Cubic meters

1½ minutes

1.53 to 2.28 Cubic meters

2 minutes

- 4.12 **Testing Area :** There shall be provided in the Concrete Mixing Machine Platform, a satisfactory room to house the control testing equipment and to provide working space for the inspector and in an area adjacent to or in the concrete mixing platform a space suitable for use in the slump testing of concrete and the molding of concrete test specimens. The size and arrangement of this room will be subject to approval by the Engineer. The Contractor shall provide utilities (electricity, air, water) as required for use in control testing.
- 4.13 **Conveying :** Concrete shall be conveyed from mixer to the place of final deposit as rapidly as practicable by methods which will prevent segregation or loss of ingredients. Any wet batch hopper through which the concrete passes shall be conical in shape. There shall be no vertical drop greater than 900mm except where suitable equipment is provided to prevent segregation and where specifically authorized. Belt conveyors, chutes, or other similar equipment will not be permitted for conveying concrete except where the use of such equipment is approved in writing by the Engineer, in advance of any use.
- 4.14 **Placing:**
- 4.14.1 **General :** No concrete shall be placed until all formwork, reinforcement, installation of parts to be embedded, bracing of forms and preparation of surfaces involved in the placing and the method of placement have been approved by the Engineer. Approval of method of placement proposed will not relieve the Contractor of his responsibility for its adequacy and he shall remain solely responsible for the satisfactory construction of all work under the Contract. Before concrete is placed, all surfaces upon or against which concrete is to be placed shall be free from standing water, mud, debris or loose material. All surfaces of forms and embedded material that have become encrusted with dried mortar or grout from concrete previously placed shall be cleaned of all such mortar or grout before the surrounding or adjacent concrete is placed. The surfaces of absorptive materials against or upon which concrete is to be placed shall be moistened thoroughly so that the moisture will not be drawn from the freshly placed concrete. Concrete shall be worked into the corners and angles of the forms and around all reinforcement and embedded items without permitting the material to segregate. Concrete shall be deposited as close as possible to its final position in the forms. The depositing of concrete shall be regulated so that the concrete may be effectively compacted with a minimum of lateral movement into horizontal layers approximately half meter in thickness. No concrete that has partially hardened or been contaminated by foreign materials shall be deposited in the structure nor shall re-tampered concrete be used unless approved by the Engineer. The surfaces of construction joints shall be kept continuously wet for at least eighteen hours during the twenty-four hours period prior to placing concrete except as otherwise directed by the Engineer. All free water shall be removed and the construction joints shall be completely surface dry prior to placement of concrete.

All concrete placing equipment and methods shall be subject to approval. Concrete placement will not be permitted when, in the opinion of the Engineer, weather conditions prevent proper placement and consolidation.

- 4.14.2 **Time Interval Between Mixing And Placing :** Concrete mixed in stationary mixers and transported by non-agitating equipment shall be placed within thirty minutes after it has been mixed unless otherwise authorized. The concrete shall be placed within 30 minutes after it has been discharged.
- 4.14.3 **Placing Temperature :** Concrete shall be delivered to the forms at the coolest temperature which is practicable to produce under current conditions but in no case at a temperature in excess of 38 degree C, except as otherwise determined by the Engineer.
- 4.15 **Lifts in Concrete :** Concrete shall be installed in lifts of depths as shown on the Drawings. The placement of concrete shall be carried on at such a rate and in such a manner that formation of cold joints is prevented. Slabs shall be placed in one lift unless otherwise authorized or directed. In walls, lifts shall terminate at such levels as will conform to structural details. Where slabs and beams are placed continuously with walls and columns, the concrete in walls and columns shall have been in place for at least two hours, or for a longer period when directed by the Engineer, before placing concrete in the slabs and beams. The top surface of vertically formed lifts shall be generally in level. The concrete in columns shall be placed in one continuous operation unless otherwise authorized.
- 4.15.1 **Elapsed time between placement to lifts :** Except as otherwise approved on the basis of lift drawings submitted by the Contractor, a minimum of 72 hours shall elapse between the placing of successive lifts of walls and thin sections.
- 4.16 **Time between adjacent pours :** The time between adjacent pours shall be defined as the time elapsing from the end of the striking off of one pour to the start of placing the next pour. The minimum time elapsing between adjacent pours shall be five days for all such concrete.
- 4.17 **Concrete for Block outs :** Block outs for equipment and fittings and for such other works as indicated or directed shall be provided as indicated on the drawings. After the said equipment and fittings have been installed and adjusted in their final location, the block out recesses shall be filled with concrete. Before installing the components to be embedded in blackout concrete and before depositing any block out concrete, the concrete surfaces of the block out shall be cleaned in the manner specified for cleaning construction joints.
- 4.18 **Placing concrete through reinforcement :** In placing concrete through reinforcement, care shall be taken that no segregation of the coarse aggregate occurs. On the bottom of beams and slabs, where the congestion of steel near the forms makes placing difficult, a layer of mortar of a composition compatible with the required concrete strength as directed shall be first deposited to cover the surface to a depth of approximately 20mm.
- 4.19 **Mechanical Vibrating Equipment :** Concrete shall be compacted with
-

mechanical vibrating equipment supplemented by hand spading and tamping. In no case shall vibrators be used to transport concrete inside the forms. The vibrating equipment shall be of the immersion type and shall at all times be adequate in number of units and power of each unit to properly consolidate all concrete. Form or surface vibrations shall not be used unless specifically approved. The intensity (Amplitude) of vibration shall be sufficient (frequency not less than 8,000 impulses per minute) to produce satisfactory consolidation. The duration of vibration shall be limited to that necessary to produce satisfactory consolidation. Excessive surface working will not be permitted.

4.20 **Forms:**

4.20.1 **General :** Forms shall be true to line and grade, mortar tight and sufficiently rigid to prevent objectionable deformation under load and shall be such as will yield fair face concrete with smooth surface. Where forms for continuous surfaces are placed in successive units, care shall be taken to fit the forms over the completed surfaces so as to obtain accurate alignment of the surface and to prevent leakage of mortar. Responsibility for their adequacy shall rest with the Contractor; however, the type, shape, size, quality and strength of all materials of which the forms are made shall be subjected to specific approval by the Engineer. Bolts and rods used for internal ties shall be so arranged that when the forms are removed, metal will not be less than 50mm away from any concrete surface. Wire ties will not be permitted where the concrete surface will be exposed to weathering and where discoloration will be objectionable. Suitable openings as required shall be provided in the formwork for the passage of piping ducts, channels, etc. All forms shall be so constructed that they can be removed without damaging the concrete. All exposed joints, edges and external corners shall be chamfered 18mm at 45 degrees except as otherwise shown. Internal corners shall be filleted where indicated or required.

4.20.2 **Coating :** Shortly before the concrete is placed, forms for exposed surfaces shall be coated with an approved non-staining form oil which shall not interfere with the set of the concrete nor be otherwise deleterious. After oiling, surplus oil on the form surfaces and any oil on the reinforcing steel or other surfaces requiring bond with the concrete shall be removed to the satisfaction of the Engineer. Forms of unexposed surfaces may be thoroughly wetted, in lieu of oiling, immediately before the placing of concrete.

4.20.3 **Removal :** The Contractor shall be responsible for ensuring that sufficient time has elapsed for the concrete to attain sufficient strength before removal of the forms. Forms shall be removed with care so as to avoid injury to the concrete. Forms shall be removed as soon as practicable keeping in view the minimum time requirements to avoid delay in water curing and to enable earliest practicable repair of surface imperfections. In order to avoid excessive stresses in concrete that might result from swelling of the forms, forms for wall openings shall be loosened as soon as this can be accomplished without damages to the concrete. Forms for the openings shall be constructed in such a manner as to facilitate such loosening. Forms shall not be removed until the strength of the concrete is such that form

removal will not result in perceptible cracking, spalling and breaking of edges of surfaces or other damages to the concrete. Forms shall not be removed before the expiration of the minimum time indicated below except as otherwise directed or specifically authorized by the Engineer.

Beams and slabs	14 days
Columns (and walls).	24
hours Mass concrete	24
hours	

- 4.21 **Tolerances for Concrete Construction :** Permissible surface irregularities for the various classes of concrete surface finish as specified in Class 4.24 "Finishes and Finishing" are defined as finishes and are to be distinguished from tolerances as described herein. In general, the permissible construction tolerances for reinforced concrete shall conform to the requirements of the following table as applicable. The specific tolerances for each structure and part thereof shall be as determined by the Engineer. Notations on the drawings of specific maximum or minimum tolerances in connection with any dimensions shall be considered as supplemental to the tolerances specified herein and shall control. The Contractor shall be responsible for setting and maintaining concrete forms sufficiently within the tolerance limit so as to ensure that the completed work will be within the tolerance specified herein. Concrete work that exceeds the tolerance limits specified herein shall be remedied or removed and replaced by and at the expense of the Contractor.

4.21.1 Variation from plumb.

- A) In the lines and surfaces of columns piers, walls and in arises.

In any 3.05 meter of length	6mm
Maximum for the entire length	19mm

- B) For exposed corner columns, control joint grooves, and other conspicuous lines :

In any 6.1m of length	6mm
Maximum for the entire length.	13mm

4.21.2 Variation from the level or from the grades specified in the contract drawings.

- A) In slab soffits, ceiling, beams, soffits and in arises, measured before removal of supporting shores.

In any 3.05m of length	6mm
In any bay or in any 6.1 of length	10mm
Maximum for the entire length.	19mm

- B) In exposed lintels, sills, parapets, horizontal grooves, and other conspicuous lines.

In any bay or in 6.1m of length	6mm
Maximum for the entire length.	13mm

4.21.3 Variation of the linear building lines from established position in plan and related position of columns, walls and partitions.

In any bay	13mm
In any 6.1m of length	13mm
Maximum for the entire length.	25mm

4.21.4 Variation in the sizes and location of sleeves, floor openings and wall openings. 6mm

4.21.5 Variation in cross-sectional dimensions of columns and beams, and in the thickness of slab and walls.

Minus	6mm
Plus	13mm

4.21.6 Footings :

A) Variations in dimensions in plan :

Minus	13mm
Plus	51mm

B) Misplacement or eccentricity : 2 percent of the footing width in the direction of misplacement but not more than 51mm

C) Thickness : In specified thickness 5 percent

4.21.7 Variation in steps :

A) In a flight of stairs

Riser	3.2mm
Tread	6mm

B) In consecutive steps :

Riser	1.6mm
Tread	3.2mm

4.22 Repair of Concrete :

4.22.1 General : Concrete that is damaged from any cause, concrete that has honeycombed, fractured or other defective, and concrete which because of excessive surface depressions, must be excavated and built up to bring the surface to the prescribed lines, shall be removed and replaced with dry-pack, mortar or concrete as hereinafter specified. Repair of concrete shall be performed only by skilled workmen and within 24 hours of removal of forms. The Contractor shall keep the Engineer advised as to when repair of concrete will be performed. Unless inspection is waived in each specific case, repair of concrete shall be performed only in the presence of the Engineer. Repair shall be made in accordance with procedures approved by the Engineer.

4.22.2 Materials : All materials used in the repair of concrete shall conform to the applicable requirements of the related Specifications.

4.22.3 Protrusions : When bulges and abrupt irregularities protrude outside the specified limits on formed surfaces not to be concealed permanently the protrusions shall be reduced by bush-hammering and grinding so that the surfaces are within the specified limits.

4.23 Depressions :

4.23.1 General : All fillings for depressions shall be bonded tightly to the surfaces of the holes and shall be sound and free from shrinkage cracks and drummy areas after fillings have been cured and have dried. All fillings, in surfaces of structures prominently exposed to public view shall contain sufficient white Portland cement to produce the same color as that of the adjoining concrete. Repairs shall be made with concrete filling, mortar filling or dry pack filling directed to be made by the Engineer. Concrete, mortar and dry pack mortar filling shall each be mixed in proportions approved by the Engineer to produce and repair at least equivalent in strength and durability to the concrete in which the repair is required.

4.23.2 Concrete Filling : Concrete filling shall be used for holes extending entirely through concrete sections, for holes in which no reinforcement is encountered and which are greater than 0.1 square meter and deeper than 10cm, and for holes in reinforced concrete which are greater in area than 0.05 square meter and which extend beyond reinforcement.

4.23.3 Mortar filling, placed under impact by use of a mortar gun, may be used for repairing defects not exposed to public view where the defects are too wide for dry pack filling and too shallow for concrete filling and no deeper than the far side of the reinforcement that is nearest the surface.

4.23.4 Dry pack Mortar Filling : Dry pack mortar shall be used for filling holes having a depth nearly equal to or greater than the least surface-dimension, for narrow slots cut for repair of cracks, for grout pipe recesses as specified. Dry pack mortar shall not be used for filling behind reinforcement of filling holes that extend completely through

a concrete section. If removal of the ends of form ties results in recesses, the recesses shall be filled with dry pack mortar provided filling of recesses in surfaces upon or against which fill material or concrete is to be placed

will be required only where the recesses are deeper than 25mm in walls less than 305mm thick.

4.23.5 Surface Finishes of Patched Areas : The Contractor shall correct all imperfections on the concrete surfaces as necessary to produce surfaces that conform to the requirements specified for the adjacent area in Clause 4.24 “ Finishes and Finishing “ Unless otherwise approved, repair of imperfections in formed concrete shall be completed within 24 hours after removal of forms. Fins and encrustations shall be neatly removed from surfaces.

4.24 Finishes and Finishing :

4.24.1 General : Allowable deviations from plumb or level and from the alignment, profile grades, and dimensions shown on the Drawings, specified in clause 4.21. “Tolerances for Concrete Construction”, are defined as tolerance and are to be distinguished from irregularities in finish as described herein. The classes of finish and the requirements for finishing of concrete surfaces shall be as generally specified in this Clause and as indicated on the drawings. Finishing of concrete surfaces shall be performed only by workmen who are skilled concrete finishers. The Contractor shall keep the Engineer advised as to when finishing of concrete will be performed. Unless inspection is waived in each specific case, finishing of concrete shall be performed only in the presence of the Engineer. Concrete surfaces will be tested by the Engineer where necessary to determine whether surfaces, irregularities are within the limits hereinafter specified. Surface irregularities are classified as abrupt or gradual Offsets caused by displaced or misplaced from sheathing or lining or form sections or otherwise defective form lumber will be considered as abrupt irregularities and will be tested by direct measurements. All other irregularities will be considered as gradual irregularities and will be tested by use of a template, consisting of a straight-edge or the equivalent thereof for cured surfaces. The length of the template will be 1.52 meters.

4.24.2 Finishes :

General : The classes of finish for concrete surfaces shall be as shown on the drawings or as directed by the Engineer. Interior surfaces shall be sloped for drainage where shown on the drawings or directed. Surface which will be exposed to the weather and which would normally be level, shall be sloped for drainage. Unless the use of other slopes or level surfaces is indicated on the drawings or directed, narrow surfaces, such as tops of walls, shall be sloped approximately 10mm per 30.5cm. No grinding will be required on such formed surfaces other than that necessary for repair of surface imperfections as specified herein .

4.24.3 Ordinary Finish : Ordinary finish (OF) applies to surfaces upon or against which fill material or concrete is to be placed. If unformed, the

finishing operations shall consist of sufficient formed the surfaces require no treatment after form removal except for repair of defective concrete and filling of holes left by the removal of fasteners from the end of the tie-rods as required under Clause 4.22 "Repair of Concrete" and specified curing. Correction of Surface irregularities shall be required for depression only for those which exceed 25mm when measured as described in related specification.

4.24.4 Rough Concrete Finish : Rough concrete finish (RC) applies to surfaces which are intended to receive ceramic tiles metallic lining or other applications as indicated on the drawings. After consolidation and leveling of the concrete to the specified tolerances, the surface shall be roughened with stiff brushes or rakes before final set. Where rough-concrete finish is specified for wall surfaces, the same shall be obtained by use of formwork suitable to produce the required finish. Surface irregularities measured as described before shall not exceed 10mm for floors and 6mm for walls.

4.24.5 Fair Concrete Finish : Fair concrete finish applies to formed surfaces, the appearance of which is considered by the Engineer to be of special importance such as surfaces of structures prominently exposed to public inspection. Surface irregularities measured as described before shall not exceed 6mm for gradual irregularities and 3mm for abrupt irregularities except that abrupt irregularities will not be permitted at Construction joints. Abrupt irregularities at Construction Joints, abrupt irregularities elsewhere in excess of 3mm shall be reduced by grinding to conform to the specified limits. Abrupt irregularities at Construction Joints shall be ground on a level of 1 to 20 ratio of height to length. All fair finished concrete will be protected throughout the project from any damage due to construction related damages. It should also be protected from weathering conditions. The method of protection will be approved by the Engineer and should be to his satisfaction. All fair finished concrete will be protected through out the construction period till the time of hand-over from any damage. These surfaces will be protected from any staining, mechanical damage, etc. It will be the responsibility of the Civil Contractor to protect these surfaces from damage by any other agency on site. The surface will also be protected from weathering. No extra payment will be made to the Contractor for this work. The cost if it shall be deemed to have been included in the respective rate in the Bill of Quantities for Fair Finished Concrete.

4.24.6 Ordinary Slab Finish : Ordinary slab finish (OS) applies to floor surfaces which are intended to receive ceramic or thermoplastic tiles and other floor coverings or without any coverings as indicated on the drawings. After the concrete has been placed, consolidated, struck-off and leveled and the concrete surfaces have stiffened sufficiently, floating shall be performed by use of hand or power driven equipment and shall be minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Floating shall be continued until a small amount of mortar without excess water is brought to the surface so as to permit effective troweling. Steel troweling shall be started when the floated surface has hardened sufficiently to prevent excess of fine material from being drawn to the surface. Steel

troweling shall be performed with firm pressure such as will flatten the sandy texture of the floated surface and produce a dense uniform surface, free from blemishes and trowel marks. Surface irregularities measured as described before shall not exceed 10mm.

4.25 Curing :

4.25.1 General : All concrete shall be cured by and approved method or combination of methods. The Contractor shall have equipment and materials needed for adequate curing and protection of the concrete on hand and ready to use before actual concrete placement begins. Means shall be provided for the protection of concrete from the sun drying winds and traffic until the specified curing has been completed. The curing medium and method or the combination of mediums and methods used shall be subject to approval in writing. The curing medium shall be applied so as to prevent loss of moisture from the concrete. Concrete shall be protected from heavy rains for 24 hours and direct rays of the sun for 14 days. All concrete shall be adequately protected from damage. No fire or excessive heat shall be permitted near or in direct contact with concrete at any time. All galleries, conduits and other formed openings through the concrete shall be closed during the entire curing period.

4.25.2 Moist Curing : Concrete shall be moist-cured by maintaining all surfaces continuously (not periodically) wet for at least 28 days immediately following the placing or until covered with fresh concrete. Curing water shall be removed without allowing stagnant pools of water to form on the exposed lift surface. Water for curing shall comply with the applicable requirements of clause 3.3 "Water". Surfaces of concrete which are to be permanently exposed shall be cleaned if a water is used which stains the surfaces during curing. Where forms of tongue-groove or shiplap sheathing are used and are left in place during curing, the sheathing shall be kept wet at all time. Finished horizontal surfaces cured with sand shall be covered with a minimum uniform thickness of 5cm of sand which shall be kept continuously saturated. The following exceptions to the requirements for moist curing are permitted. Moist curing of surface against which backfill is to be placed within 24 hours of concrete placement will not be required.

5 MEASUREMENT AND PAYMENT :

5.1 Measurement : Measurement, unless as otherwise specified, of concrete will be made on the basis of the actual volume of concrete in Cu. Meter / Cft in place within the neat lines of the structure, as indicated on the drawings or as otherwise established by the Engineer. Measurement for payment will not be made of concrete nor any ingredients including cement in concrete which is placed outside the bay lines shown on the Drawings. Measurements of concrete placed against the sides of any excavation without the use of intervening forms will be made only within the paying of the structure.

5.2 Payment : Unless otherwise specified, the payment of concrete will be made at the respective contract unit price per Cu. Meter / FT for various items of Bill of Quantities, which price shall include the cost of all labor and materials (except reinforcement) equipment's and tools required to complete the batching, mixing, transporting, placing, protecting, curing, forming, etc. as required for concrete work under these specifications.

END OF SECTION

CEMENT PLASTER

1. SCOPE OF WORK.

The work covered by this section of the Specifications consists of furnishing all plant, labor, equipment, materials and performing all operations in connection with cement plaster work, complete in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract. The scope of this section of specifications is covered with detailed specifications as laid down herein.

2. APPLICABLE STANDARDS.

The work shall be completed with the requirements of Pakistan, British and ASTM standards.

3. GENERAL.

- 3.1 Except as may be otherwise shown on surfaces specified, all plaster work, both internal and external, shall be Ordinary Portland cement plaster of the required thickness mentioned in B.O.Q. Internal plaster for the buildings for all the internal surfaces; columns, walls ceilings, partitions, etc. shall be cement plaster finished smooth unless otherwise specified. Whereas the areas like lavatory blocks, bathrooms, stores, or such other places where there is possibility of any dampness occurring, the plaster shall be cement plaster finished smooth with approved waterproofing chemical or as specified in the BOQ. Except as otherwise specified, all plaster work shall be carried out in Conformity with acceptable code of practice for internal and external rendering and finishes.
- 3.2 Plastering shall not commence until all electric conduits, drainage and sanitary pipes, inlets to tanks, brackets, clamps, sills, doors' and windows' frames and all sorts of inserts and embedded items are fixed in position. It shall be the responsibility of the Contractor to make sure that all such works are carried out by other Contractors before starting of plaster work. Chiseling and repairing of cement plaster shall not be permitted without the approval of the Engineer or Architect.

4. MATERIALS :

- 4.1 **Cement :** Cement for plaster shall be Portland Cement either ordinary, rapid hardening or sulphate resisting cement and shall conform to requirement as described in the specifications of concrete.
 - 4.2 **Sand :** Sand for plaster shall comply with the requirements of BS-812, BS-119 and ASTM C-144. It shall comprise natural sand, crushed stone sand or crushed gravel sand. It shall be hard durable, clean and free from adherent coatings such as clay and from any appreciable amount of clay pellet form. It shall not contain harmful materials to adversely affect the hardening, the strength, the durability or the appearance of the plaster or any materials in contact with it. The quantity of clay, silt and dust shall not exceed 5% by weight for sand or crushed gravel or 10% by weight for crushed stone sand. The grading of sand for internal plaster work and external rendering shall be within the following limits.
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Percentage by weight passing Sieve Sizes			
Sieve Size	Gypsum Plaster Under Coats. Not	Gypsum Plaster Finishing Coats.	Internal Cement Plaster Work &
MM	Used. %	Not Used. %	External Renderin g %
5.00	100	100	100
2.36	90-100	100	90-100
1.18	80-90	95-100	70-100
0.6	30.55	30-85	40-80
0.3	5.40	5.50	5.40
0.15	0.10	0.10	0.10

The grading specified above shall be suitable for smooth finishing coats, scraped finishes and for pebble dash or dry dash for textured surfaces, produced by the treatment of the freshly applied final coat with a tool, the coarser particles shall be removed by screening through a 2mm sieve.

- 4.3 Water :** Water for plaster shall conform to requirements as described in the specifications of concrete.
- 4.4 Additives :** Additives for controlling the setting and working characteristics of plaster, or for imparting anti-corrosion, fungicidal or water proofing properties, shall be added to the plaster strictly in accordance with the particular manufacturer's specifications and instructions. Good quality hair or Manilla fiber in reasonably well distributed proportion may be added to the plaster to assist application and reduce droppings. No additives shall be used except as specified in the Contract Documents.

5. PROPORTIONING AND MIXING.

- 5.1** Measurement of materials by volume shall be by containers of known capacity to maintain consistent proportions. No lumpy or caked material shall be used. Mixing equipment boxes and tools shall be clean. Materials shall be proportioned as specified on the drawings, in the Bill of Quantities or as directed by the Engineer. Mixing shall be continuous until complete and all ingredients are evenly distributed.
- 5.2** Only limited water shall be added for proper workability and such quantity of the mortar shall be prepared as that which will be consumed in thirty minutes after preparation. Preparation of mortar in bulk quantity for use during the entire day or for any other time more than that stipulated above is expressly prohibited. Retampering shall not be permitted and all mortar which has begun to stiffen shall be discarded.
- 5.3** Plaster ingredients shall be thoroughly mixed, either by hand on a clean cement concrete platform or by a mechanical mixer, as directed by the Engineer.

6. PREPARATION OF SURFACE TO BE PLASTERED.

- 6.1** Concrete surface to be plastered shall be cleaned to remove all grease, oil and other surface impurities, which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface of all concrete ceilings, beams and

columns shall be lightly hacked by approved means to give the required key for plastering.

- 6.2** All masonry surface to be plastered shall be cleaned to remove all matter which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface shall be washed with clean water and kept damp for 24 hours before further treatment. The surface thus prepared shall be treated uniformly with cement and sand slurry. The slurry to be used shall be one part cement to one part sand by volume with water added to make a stiff creamy mix. This slurry shall be applied with a stiff brush on surface, which has previously been well wetted. The surface so treated shall be left to cure for three days.

7. APPLICATION OF PLASTER.

- 7.1** The plaster shall be minimum 12-20mm thick, as mentioned in BOQ and shall not be less than 12mm thick at any internal surface or 20mm at any external surface. The plaster of a thickness less than the specified thickness shall be rejected. If the plaster is to be more than 25mm thick, it shall be done in two coats. The surface of first coat shall be made rough before the second coat is applied. The plaster shall not have wavy surface and shall be perfectly in plumb. The edges and corners shall represent a straight line. The plaster shall be kept wet continuously for at least ten (10) days. The curing/wetting of the plastered surface shall start immediately after the surface is set i.e. 4-5 hours from the time of finishing. No extra payment shall be allowed for jambs, junctions, corners, edges, round surfaces or for more than one layer of plaster required due to any unevenness in the work done by the Contractor. The plaster work is to cover all conduits, pipes etc. fixed in the walls and ceiling. Wherever specified, metal lath shall be nailed firmly before plastering is commenced. The plaster surface shall be tested frequently with 3 meter straight edge and plumb bob.
- 7.2** Plaster containing cracks, blisters, pits, discoloration or any defects shall not be acceptable. Any such plaster or loose plaster shall be removed and replaced with plaster in conformity with these specifications and as additionally directed by the Engineer. Contractor shall cut and patch all defective work at his own cost. All damaged plaster shall be patched as directed by the Engineer. Patching plaster shall match appearance of and shall be finished level with adjoining plaster. If the Engineer does not accept patch work, he may ask to replace the entire wall, ceiling, area. etc.
- 7.3 Cement Plaster Finished with Cement Niro :** The first coat (Scratch coat) of cement plaster is to be applied as specified and immediately while the plaster is still fresh a floating coat of neat cement shall be applied on it and the surface shall be finished smooth by steel trowel. The plaster with wavy surface or trowel marks shall be rejected.
- 7.4 Rough Cast Stucco Plaster :** The rough cast finished cement plaster shall be composed as follows :-
- First Coat :** One part of Portland Cement and three parts of sand or as provided in Schedule of Quantities.
- Second Coat:** Two parts of Portland Cement and two parts of shingle or crushed stone or pea size gravel and three parts of sand or as provided in Schedule of Quantities.

The materials shall be mixed in a dry state either by hand or in mechanical mixer.

When the materials are thoroughly and uniformly mixed, then sufficient water shall be added to give workable consistency. The thickness of the first or strengthening coat shall not exceed 15mm or be less than 10mm. When this coat has commenced to dry and harden, it should be combed when evenly distributed, wavy horizontal combing about 15mm apart, and not more than 3mm deep. The thickness of the final coat shall be controlled by texture required by the Engineer-in-Charge shall not be less than 6mm or more than 10mm.

- 7.5 Washed Terrazzo Finish :** The washed terrazzo finish on interior or exterior surfaces shall be composed as follow.

First Coat : The composition and application of this shall be similar to the first coat of Stucco plaster above.

Second Coat : One part of white or grey Portland Cement as provided in Schedule of Quantities and two parts of marble chips.

The materials of the second coat shall be hand mixed in a dry state before sufficient quantity of water is mixed to give a workable consistency. When this coat has commenced to set, (approximately 30-45 minutes after application) it should be washed and slowly scraped with a brush to expose the aggregate. The thickness of the second coat shall be between 10-12mm as required by the Engineer-in-Charge.

- 7.6 Water-Tight Cement Plaster for Damp-Proof Course :** This type of plaster, where specified, shall be carried out very carefully. The cement sand proportions shall not be less than 1:3 or as specified. The water tight reagent such as approved additive shall be mixed dry with the cement sand mixture in the quantity specified in the schedule of description of works. The sand for this item shall be specially selected. The cement, sand and powder are thoroughly mixed and water is added to the extent, it is required to make the paste to apply as plaster. Water should be added to that much mixture of cement, sand and powder, as would be used within the initial set, as per instructions of the manufacturers. The surface plastered shall be thoroughly protected from dry winds and the sun and kept wet for at least 10 days.

- 7.7 Drip Courses and Moldings :** Drip course is to be provided in all projections, whatever the nature of cantilevers projections in sills or architraves, etc., may be. Where drip course is to be provided in cast-in-situ concrete it may be cast by placing an inch dia. bar at the position where the drip course is required. Every care shall be taken to see that the drip course is exactly horizontal and parallel to the face of the wall. Drip courses made out in plaster shall be made of richer mix than the plaster and shall be uniform in width and depth and preferably horizontal. Moldings at ceiling or around openings shall be made as shown in the drawings.

8. METAL LATH AT JUNCTION OF CONCRETE & MASONRY, CONDUIT CHASES, ETC.

Metal lathing, at the junction of concrete & masonry, conduit chases, etc., shall be fabricated from sheet steel, and shall be of uniform quality and free from flaws, broken strands, cracks and corrosive pitting, shall be rectangular and true to shape.

Before plastering, wherever masonry meets with reinforced concrete members a 12" inches wide continuous strip of expanded metal lath shall be nailed to the masonry and the reinforced concrete member covering the joint completely to prevent cracking of the joint.

9. BEADS AND PROFILES.

Angle beads, corner beads, stop beads, architraves beads, depth gauge beads, edging profiles, plaster dividing profiles, interior angle profiles, plaster borders and the like shall all be manufactured from sheet steel and galvanized after fabrication, all beads and profiles shall be perforated at edges to ensure good adhesion of the plaster work. Thickness and dimensions shall suit particular locations and plaster work thickness.

Nails for fixing metal lathing shall be of stainless steel and have either clout heads or small flat heads to suit particular locations. All angle beads, stop beads, architrave beads, depth gauge beads, and the like are to be fixed in accordance with the manufacturer's instructions.

10. CLEANING AND PROTECTION.

- 10.1** Rubbish and debris shall be removed as necessary to make way for work of other trades and as directed by the Engineer. As each room or space is completed, all rubbish, debris, scaffolding and tools should be removed to leave the room clean.
- 10.2** Prior to plastering all aluminum windows and finished metals should be covered by sheet of plastic or tarpaulin to protect them from damage.
- 10.3** Protect finished plaster from injury by any source. Contractor shall also protect walls, floors and work of other trades from plaster materials.

11. TOLERANCES.

Surfaces of plaster work shall be finished with a true plane to correct line and level with all angle and corners to a right angle unless otherwise specified and with walls and reveals plumb and square.

Maximum permitted tolerances shall not exceed 3mm in 2m variation from plumb or level in any exposed line or surface and 1.5mm variation between planes of abutting edges or ends.

12. MEASUREMENT AND PAYMENT.

12.1 General.

- 12.1.1** Except otherwise specified herein or else where in the Contract Document, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.
 - 12.1.2** Joints, junctions, jambs, corners, drip course, edges and rounding's.
 - 12.1.3** More than one layer due to any unevenness in the work done by the Contractor.
 - 12.1.4** Cutting and patching of all defective works.
 - 12.1.5** Surface preparation, cleaning, providing expanded metal lath and protections as specified.
 - 12.1.6** Water proofing agent for water-proof plaster.
 - 12.1.7** Angles beads, corners, beads, stop beads, architraves beads, depth gauge,
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edging profiles, plaster dividing profiles, interior angle profiles and plaster borders used in plaster works as shown on drawings if these are required in the respective items of Bill of Quantities.

12.2 Plain Plaster.

12.2.1 Measurement : Deductions shall not be made for ends of joints, beam posts, etc., and openings not exceeding 0.5 square meter each and no addition shall be made for reveals, jambs, soffits, sills, etc. of these openings nor for finishing the plaster around ends of joints, beams posts etc. In case of opening of area exceeding 0.5 square meter each, deduction shall be made for the openings and addition shall be made for reveals jambs, soffits, sills, etc. of these openings. Measurement for acceptably completed works of plaster will be made on the basis of number of square meter of the surface area plastered as shown on the Drawings or as directed by the Engineer.

12.2.2 Payment : Payment will be made for acceptable measured quantity of plaster on the basis of unit rate per square meter quoted in the Bill of quantities and shall constitute full compensation for all the works related to the item.

12.3 Water Proof Plaster.

12.3.1 Measurement : Measurement for acceptably completed works of water proof plaster will be made on the basis of number of square meter/Sft of the surface area plastered as shown on the drawings or as directed by the Engineer.

12.3.2 Payment : Payment will be made for acceptable measured quantity of water-proof plaster on the basis of unit rate per square meter/Sft quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

END OF SECTION

FLOORING

1. SCOPE OF WORK.

The works covered under this section of specifications consists of furnishing all labor, materials and equipment and performing all operations in connection with laying flooring including bases, dados and skirtings in strict accordance with drawings and as specified herein and subject to terms and conditions of the contract documents.

2. EARTH FILL UNDER FLOORS.

The filling inside the plinth up to the required level of the base shall be carried out in layers of not more than 200mm thickness. Each layer shall be thoroughly watered and compacted to minimum 95% of dry density before the next layer is laid. The earth on site from excavation shall be used only if it is suitable, non-expansive and approved by the Engineer.

3. SAND FILL.

A uniform layer of sand shall be laid to the required thickness over the surface of compacted earth. The sand layer shall be compacted in the manner required by the Engineer prior to execution of subsequent item.

4. STONE SOLING.

The quality of stone material shall be as per requirements for best quality work, and shall be approved by the Engineer. The stones shall be laid on edge as approved by the Engineer. When the stones have been rammed in place and the surface is satisfactory, the spaces or voids between and around shall be grouted with cement mortar 1:6 unless otherwise specified. The cement grout shall be poured and broomed into the spaces between the stones. This operation shall be continued until the grout remains flush with the top of the stones. The grout shall be of such consistency that it will flow readily into the spaces between the stones but it must not be so wet that solid matter separates from the water. No further work shall proceed on this stone soling until the cement grout has set sufficiently.

5. BRICK PAVING.

The Contractor shall lay brick pavement at locations indicated on drawings or where directed by the Architect/Engineer.

5.1 Materials shall conform to all the requirements specified in Section "Brick Masonry".

5.2 The Contractor shall prepare compacted sub-grade up to 95% of dry density, finished accurately to lines, grades and dimensions shown on drawings or as directed, diagonal herring bone or other pattern as directed by the Engineer. The Contractor shall first make small samples on site and the Architect/Engineer shall select any suitable pattern. The joints shall be 6mm to 9mm thick unless otherwise specified and shall be filled in with approved mortar for full depth as specified. Curing should be made in on approved manner as already explained in section "Brick Masonry".

6. CEMENT CONCRETE.

The base course of cement concrete shall be 1:3:6 concrete unless otherwise specified. The surface of the bed shall be roughened for the grip of the top layer.

7. FLOOR FINISHES.

All floor finishes shall be laid on properly cleaned and prepared sub-floors to the thickness as indicated on the drawings and finished to the satisfaction of Engineer. The

Contractor shall make sample panels of floors for inspection and approved by the Architect/Engineer before actual flooring works are taken in hand.

8. CEMENT CONCRETE FLOORS.

- 8.1** The concrete ingredients shall be mixed in a batch mixer for not less than 1½ minutes after all ingredients except the full amount of water, are in the mixer. The concrete shall be uniform in composition and consistency from batch to batch except when changes in composition or consistency are required. Water shall be added prior to, during and following the mixer charging operations. Excessive or over mixing or increasing concrete consistency will not be permitted. The concrete ingredients shall be mixed by volumetric measurement in purpose made boxes approved by the Engineer.
- 8.2** The screed may be laid when the concrete is still plastic, thus forming a monolithic slab, or on set and hardened concrete. In the first case, any foreign material, laitance or water on the surface of the base should be removed shortly before the screed is laid. In the second case the surface of the base concrete should be brushed with a stiff broom, just before it hardens, to remove all laitance and loose aggregate and at the same time, to roughen the surface to improve the bond. The hardened base should be thoroughly cleaned, wetted, preferably overnight surplus water removed and a grout of cement and water brushed into the surface keeping just ahead of the application of the screed.
- 8.3** The adhesion between the screed / topping and base shall be tested by tapping the surface with a rod or a hammer. A hollow sound indicates poor adhesion. Loss of adhesion does not necessarily mean that the screed or concrete topping is unsatisfactory. However, when it is accompanied by visible or measurable lifting at the edges of bays or at cracks, the screed or concrete topping may deflect and break under the loads imposed in use and shall be considered unsatisfactory. Where the screed or concrete topping is considered to be unsatisfactory it shall be necessary to redo the whole of the affected bay or bays.
- 8.4** The tolerance in level over a 2m length shall not exceed +3mm.

9. TERRAZZO FLOORING (IN SITU).

The Contractor shall submit samples of terrazzo flooring required in the various locations and the samples, which Engineer may select for use in the buildings shall be available for examination and comparison by both the Contractor and the Engineer. The finished floors shall conform in all respects to the characteristics of the samples approved. The size of chips shall be of 3mm to 10mm size and the color will be as selected by the Architect/Engineer.

The Contractor, after tentative color patterns are approved, shall provide sample panels of cast in place terrazzo wear coat and base, he proposes to use for subsequent approval of the Engineer before proceeding with his work. The thickness of the wear coat shall be uniform and at no point shall it be less than 15mm. Wherever a cove base is required with skirting or dado, the radius shall be uniform and shall be made together with the skirting/dado. Under no circumstances, with a joint at the base to introduce the curvature will be allowed. Finished surfaces of both floors and walls when completed, ground and polished, shall in all cases show uniformly distributed exposed granules or chips, free of undesirable blotches of matrix without marble granules or chips. Uneven distribution in either floor or wall surface will be required to be resurfaced and/or refinished to the satisfaction of the Engineer. All floors shall be adequately cured for a minimum of 14 days after laying by means of sand buns in panels or as required by the Engineer. During the course of construction of the floors

and up to the time of completion of the Project, the Contractor shall protect the flooring from stains and mechanical damage by his workers or by workers of other Contractors/Sub-Contractors. For the latter conditions, he may take assistance from the Engineer if required. However, in the event of damage or staining, the Contractor shall redo certain floor panels or the entire floor within a space as required by the Engineer.

10. TERRAZZO TILE FLOORING AND STEPS.

- 10.1** All tiles shall be of size 300x300mm or 200x200mm size as shown on drawings or as mentioned in the Schedule of Quantities and shall be perfectly leveled square and true to every surface. Tiles shall be minimum 25mm for 300mm size and minimum 20mm thick for 200mm size with a marble mosaic topping firmly bonded to a base of cement concrete, manufactured by the dry process and machine pressed hydraulically with a pressure of not less than 150 kg. Per square centimeter. The thickness of topping shall not be less than 13mm for 300x300mm tiles and 10mm for 200x200mm tiles.

The marble mosaic topping shall be of colors as selected by the Architect/Engineer, including sizes of chips, their color proportion and distribution. All tiles shall be of uniform color and liable to rejection due to difference in any of the above specified conditions.

The tile shall be vibrated to an extent that it releases air to the surface and consolidates the aggregate at the wearing surface. Proportion of cement to aggregate shall not be leaner than 1:2 by weight in topping layer. All tiles shall be cured after manufacture for not less than three weeks, prior to delivery at site, or setting up in floors.

If the Contractor is allowed to use ordinary tiles for stair risers he will have to cut the standard tiles for which no payment for the wastage or cutting will be made. The tiles before being used shall be thoroughly soaked in water for 10 to 20 minutes and stood on their edges to dry for about the same length of time. Any tiles, which have hair cracks shall be rejected. Should the cracks be noticed after the tiles are fixed in position, such tiles shall be replaced at contractor's cost and risk.

- 10.2** The terrazzo tiles will be laid to the required levels and grades over a setting bed of cement mortar comprising of 1 part of cement and 4 parts of sand by volume or as specified. The overall thickness of mortar and tile shall be minimum 50mm. The curing period of the setting bed should be as directed by the Engineer. As large an area of setting bed shall be spread at one time as can be covered with tiles before the mortar has set. Surplus mortar shall be removed. Floor and wall surfaces to receive the tiles shall be thoroughly cleaned of all dirt, dust, oil and other objectionable matters. Tiles shall be laid out from the center line of each space in on outward direction and the pattern should be made symmetrical with a minimum number of cut tiles. Joints between the tiles shall be of uniform width. Tiles shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Tiles shall be laid to the straight edges. The Contractor is required to submit his shop drawing before actual laying of the tiles to show in detail how and where tiles pieces are planned to be laid. The Drawing shall be approved by the Architect/Engineer. After seven days the terrazzo tile floors shall be machine ground to a true even surface using various grades of abrasive stones as required and directed by the Engineer. After the first grinding, the floor shall be grouted with the same color composition as used for its manufacture. The grout shall be of the consistency of thick cream and shall be brushed over the floor to fill in the

joints and after 72 hours the grouting coat shall be removed by grinding till a smooth and even surface is obtained. Areas and portion of the floor inaccessible for the grinding machine shall be ground and rubbed by hand. The final gloss shall be given by polishing the surface to the satisfaction of the Engineer. The tile floor shall be kept wet for at least 72 hours and no one should be allowed to walk on the tiles during that period.

11. CERAMIC / PORCELAIN TILE FLOORING AND DADO.

11.1 The tiles shall be of approved manufacturer. These will be either white or colored as specified in the Schedule of Quantities or as approved by the Architect/Engineer. The tiles shall be free from cracks or crazing, free from twisting and uniform in color and size. Approval of the manufacturer does not relieve the Contractor to carry-out his own checking to ensure that only the best quality tiles are used and all defective tiles are rejected and removed from site immediately.

11.2 Ceramic / Porcelain tiles shall be soaked in clean water 24 hours before laying. They shall be laid on cement concrete base of specified grade and the joints filled with neat white or grey cement or as specified including vertical and horizontal covers. The curing period of the setting bed shall be as directed by the Engineer. As large an area of setting bed shall be spread at one time as can be covered with tiles before the base has set. Surplus base material shall be removed. The thickness of setting bed shall not be less than 45mm for floor and 12mm for walls. Floor and wall surfaces to receive the tiles shall be thoroughly cleaned of all dirt, dust, oil and other objectionable matters. Tiles shall be laid out from the center line of each space in an outward direction and the pattern should be made symmetrical with a minimum number of cut tiles. Joints between the tiles shall be of uniform width. Tiles shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Tiles shall be laid to the straight edges. The vertical corners of the tiles shall be mitered and finished true by rubbing with carborandum stone or by another approved means. The contractor will not be entitled to claim anything extra for cutting the tiles to the required sizes and finishing the edges as approved by the Engineer. The tile floor should be kept wet for at least 72 hours and man traffic should no be allowed on the tiles during this period.

12. MARBLE TILE/GRANITE FLOORING AND DADO.

The Contractor shall submit five samples of each marble type indicated on the drawings and the schedule of quantities. These samples must give the representative of the material that he is going to deliver clearly indicating the maximum, minimum and the percentage of variation. After approval and after the material is delivered to site, the contractor is once again required to take approval from the Engineer prior to start of laying.

Marble tiles/Granite shall be of uniform size and shall be perfectly leveled and square on all corners. They will be laid to required levels and grade with approved tile bond, over setting bed of cement mortar comprising of 1 part of cement and 4 parts of sand by volume or as specified. The minimum thickness of the mortar shall be minimum 50mm.

The curing period of the setting bed shall be as directed by the Engineer. As large an area of setting bed shall be spread at one time as can be covered with tiles before the mortar has set. Surplus mortar shall be removed.

Floor and wall surfaces to receive the tiles/granite shall be thoroughly cleaned of all

dirt, dust, oil and other objectionable matters. Tiles shall be laid out from the center line of each space in an outward direction and the pattern should be made symmetrical with a minimum number of cut tiles. Joints between the tiles shall be as per detail given in drawings uniform width. Tiles shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Tiles shall be laid to the straight edges.

After seven days the marble tile/granite floors shall be machine ground to a true even surface using various grades of imported abrasive stones as required and directed by the Engineer. After the first grinding the floor shall be grouted with approved grout as specified by Architect the same color composition as used for its manufacture. The grout shall be of the consistency of thick cream and shall be brushed over the floor to fill in the joints and after 72 hours the grouting coat shall be removed by grinding till a smooth and even surface is obtained. Areas and portion of the floor inaccessible for the grinding machine shall be ground and rubbed by hand. The final gloss shall be given by polishing the surface with imported chemical to the satisfaction of the Engineer.

13. VINYL TILE FLOORING.

Vinyl tiles shall be of specified sizes and factory finished. Color patterns shall be selected by the Architect/Engineer from the standard range from an approved manufacturer.

The tile shall have an uniform wearing surface and be color-fast to day light. The material shall be resistant to mild acids, alkalis, oils, and grease.

Adhesives for tile fixing shall be the adhesive recommended by the manufacturer supplying the tiles. After the base is cured, it will be allowed to dry completely and cleaned thoroughly to make it dust, moisture, oil and grease free. Any irregularity on the base shall be filled in and leveled before laying the tiles. An area not exceeding about 2.5 sq.m. shall be coated with approved adhesive material. 10 to 15 minutes shall be spent for airing the adhesive. Tiles shall be laid starting from one side of the room and shall be so pressed that complete adhesion takes place.

Prior to commencement of work, the Contractor shall submit to the Architect/Engineer samples of Vinyl tiles of all available color and patterns along with the sample of adhesives for approval of the Architect/Engineer. Manufacturer published instructions and recommendation shall also be submitted.

14. VITRIFIED CLAY TILE FLOORING.

Tiles shall be of the best quality and of color and size as approved by the Architect/Engineer. The overall thickness of cement sand mortar and tile shall be minimum 50mm. The mortar shall be laid to make up the total thickness of floor finish specified. The surface shall be laid to levels and grade required.

Tiles shall be laid using adequate number of spacer to ensure uniform spaces between adjacent units of the required thickness as indicated on the drawings or Schedule of Quantities. After the tiles are laid, the joints shall be grouted with 1:4 cement sand grout with or as specified in Schedule of Quantities. The grout shall be tooled in the required shape, and the Contractor shall ensure that all the joints are finished in a uniform manner as per approval of the Sample.

Care shall be taken to see that full tiles are used as far as possible. Where not possible, the edge tiles shall be neatly cut with an electric saw and the edges rubbed smooth. The edges cut shall be under the wall tile. In case of patterned tiles, the tiles shall be laid in such a way that the patterns end symmetrically on two sides.

Tiles shall be cured for 7 days with water and then thoroughly cleaned and dried. Notwithstanding anything written above the manufacturer's printed instructions regarding laying shall be strictly followed. On completion of the flooring, the entire surface shall be acid washed to remove the film of cement from the surface of the tiles, and the cost of this item shall be deemed to have been included in the quoted unit rate of the Bill of Quantities.

15. MEASUREMENT AND PAYMENT.

- 15.1** Except otherwise specified herein or else wherein the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items or the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

Grinding, washing, polishing, acid washing and finishing of tiles.

Pigments used for making of tiles or grouting material.

Grouting.

Adhesive for fixing vinyl tile

flooring. Base mortar.

Cement mortar for setting tiles.

- 15.2** Measurement of acceptably completed works of finished floor, dado, skirting, stair finish, etc. will be made on the basis of net finished area laid in position as shown on the drawings or as directed by the Engineer. Exposed edges of tiles, marble, etc. will not be included in the measurements.

Payment will be made for acceptable measured quantity of finished floor, dado, skirting, stair finish, etc. on the basis of unit rate quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the items.

END OF SECTION

GLASS AND GLAZING

1. SCOPE OF WORK.

The work covered under this section of the Specifications consists of furnishing all labour, equipment, scaffoldings and providing glass, gaskets, sealants, compounds and accessories required for performing all operations in connections with the installation and setting of glass, glazing and glass blocks and butt jointed glazed partitions complete in every respect in accordance with the Drawings or as directed by the Engineer. The scope of this section of specifications is covered with detailed specifications as laid down herein.

2. GENERAL.

2.1 The glazier must examine the framing and glazing channel surfaces, backing, removable stop design, and the conditions under which the glazing is to be performed. Do not proceed with the glazing until unsatisfactory conditions have been corrected in a manner acceptable to the Glazier.

2.2 Weather Conditions : Do not proceed with installation of liquid sealants under adverse weather conditions, or when temperatures are below or above manufacturer's recommended limitations for installation.

2.3 The Contractor shall submit two samples of each type of glass required. These samples shall be of 300mm x 300mm size or as directed. He will also submit lengths of installed (mock-up) glazing materials together with samples of glazing sealants and glazing gaskets.

2.4 Contractor shall also submit printed materials manufacturer's installation instructions for specified glazing gaskets, compounds, sealants and accessories including description of required equipment, procedures and precautions to be observed.

3. DELIVERY, STORAGE AND HANDLING.

3.1 Contractor shall deliver materials in manufacturer's original, unopened containers clearly labeled with manufacturer's name and address, material, brand, type class and rating as applicable.

3.2 Contractor shall store the materials in original unopened containers, with labels intact, protected from ground contact and from other elements.

3.3 Contractor shall handle the materials in a manner to prevent breakage of glass and damage to surfaces, and shall exercise exceptional care to prevent edge damage to glass.

4. MATERIALS.

4.1 Plain and Tinted Glass : Glass shall be free from all blemishes, bubbles, distortions and other flaws of any kind and shall be properly cut to fit the rebates so as to have a uniform clearance round the panels between the edges of glass and the rebates. All glass shall be of best quality manufacture as approved by the Architect/Engineer. Glass shall be of plate or float type, in thickness and size as shown on the drawings or Bill of Quantities. All glass shall be of such quality that surface deterioration will not develop under normal conditions of use. Glass shall have parallel surfaces and without physical impurities.

4.2 Glazing Sealants and Materials.

1. **General :** Provide colour of exposed sealant/compound indicated or if not otherwise indicated, as selected by Architect from manufacturer's standard colours. Comply with manufacturer's recommendations for selection or hardness, depending upon the locations of each application, conditions at the time of installation, and performance requirements as indicated. Select materials, and variations or modifications, carefully for compatibility with surfaces contacted in the installation.
2. **One or two part polysulfide glazing sealant :** Elastomeric polysulfide sealant specially compounded and tested to shown minimum of 20 years resistance to deterioration in normal glazing applications.
3. **One part Silicone Rubber Glazing Sealant:** Elastomeric silicone sealant, non-sag. Provide acid type recommended by manufacturer where only non-porous are contacted; provide non-acid type recommended by manufacturer where one or more porous bond surfaces are contacted.
4. **Molded Neoprene Glazing Gaskets:** Molded or extruded neoprene gaskets or the profile and hardness required.
5. **Polyvinyl Chloride Glazing Gaskets:** Extruded, flexible PVC gaskets of the profile and hardness required.
6. **Foam Glazing Tape:** Closed-cell, flexible, self-adhesive, non-extruding, polyvinyl chloride foam tape, recommended by manufacturer; comply with ASTM D 1667.
7. **Setting Blocks:** Neoprene, 70-90 durometer hardness, with proven compatibility with sealants used.
8. **Spacer:** Neoprene 40-50 durometer hardness, with proven compatibility with sealants used.
9. **Compressible Filler Rod:** Closed cell or water-proof jacketed rod stock of synthetic rubber or plaster foam, proven to be compatible with sealants used, flexible and resilient, with compression strength for 25% deflection.
10. **Cleaners, Primers and Sealers:** Type recommended by sealant or gasket manufacturer.

5. INSTALLATION OF GLAZING.

- 5.1 Glazing work shall comply with the recommendations of the glass and glazing materials manufacturers.
 - 5.2 Examine each piece of glass and discard and replace glass with edge damage or face imperfection.
 - 5.3 Clean glazing channels and other framing members indicated to receive glass. Remove coatings, which are not firmly bonded to the substrate, remove lacquer from metal surfaces wherever elastomeric sealants are to be used. Apply primer and sealer to joint surfaces wherever recommended by the sealer manufacturers.
 - 5.4 Trim and clean excess glazing materials from surrounding surfaces
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immediately after installation and eliminate stains and discolourations.

- 5.5 Cure glazing sealants and compounds in compliance with manufacturer's instructions, to obtain high early bond strength internal cohesive strength and surface durability.
 - 5.6 No glazing shall be considered complete until and unless paint and other stains have been removed from the surface of the glass.
 - 5.7 While glass operation is in progress, great care shall be taken to avoid breakage or damage to the glass and adjoining glazing. The Contractor shall make good, at his own cost, all glass broken by his workmen while cleaning or carrying out other operations. On the completion of the glazing work, all glass that has been set by the Contractor shall, if it becomes loose, within the maintenance period, be re-fixed at Contractor's expenses.
 - 5.8 The glass panes shall be properly cut to fit the rebates so as to have a uniform clearance of 2mm round the panes between the edges of glass and the frame. In the event that any pane is cut short so that the clearance exceeds the required dimension and renders the gaskets loose, the panes shall be replaced by the Contractor.
 - 5.9 Glass in butt-jointed installation shall be plain or tinted and of sizes and thickness as indicated in the drawings or the Bill of Quantities. The specifications of glass shall be as mentioned above for plain or tinted glass. The glass shall be installed with a uniform spacing between the leaves equal to the thickness of glass but not greater than 10mm. After the glass is placed on location and approved by the Engineer, the space in between shall be completely filled by a clear or opaque sealant manufactured by Dow Corning or as approved. All edges shall be marked adequately prior to sealant application.
 - 5.10 Glazing vinyl beads and gaskets shall be of suitable size and shape to fit tightly between the glass and the window/door section. The installation shall be carried out in a manner that the joints are confined to corners of glass panes, and no joint in beads and gaskets are visible on any side of the glass pane after completion of installation.
6. **PROTECTION AND CLEANING OF GLAZING.**
Remove all smears, labels and excess glazing sealant, leave clean inside and outside and free from scratches. The Contractor shall be responsible for the protection of installed glass. Before final acceptance, damaged or broken glass shall be removed and replaced with new glass at no additional expense to the Owner. All glazed surfaces shall be washed clean both inside and outside prior to final acceptance.
 7. **MEASUREMENT AND PAYMENT.**
 - 7.1 **General :** No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities.

The cost thereof shall be deemed to be included in the quoted unit rate of the relevant items of the Bill of Quantities.
 - 7.2 **Measurement :** Measurement of acceptably completed works will be made
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on the basis of net actual area in square meter / square feet of glazing material provided and installed in position as shown on the drawing or as directed by the Engineer.

- 7.2 Payment :** Payment will be made for acceptable measured quantity of glazing material on the basis unit rate quoted in the Bill of Quantities. The unit rate shall include the cost of glazing, wastage, sealants and compound for fixing the glass, all hardware fittings as per manufacturer's recommendations or as shown on the drawings. Payment shall constitute full compensation for all the works related to the item.

END OF SECTION

PAINTING AND POLISHING

1. SCOPE OF WORK.

The work covered by this section of the Specification, consists of furnishing all materials, plant, labour, equipment, appliances and performing all operations in connection with surface preparation, mixing, painting concrete works, gates, frames, structural steel works, steel pipes, valves, steel and wooden doors, windows, louvers, wall ceilings and all such surfaces as shown on the drawings/or as directed by the Engineer, the scope of this section of specification is covered with detailed specifications as laid down herein.

2. GENERAL

- 2.1** Where the work or term 'paint' and 'polish' is used or referred to throughout the specifications, it shall be interpreted to mean and include the surface finish treatment consisting of any, all or some of the following items :-

Sealers, primers, fillers, body and final coat, emulsion varnish, shellac, wall paper paste, stain or enamels as more specifically defined hereinafter as to kind and quality and function for various surfaces and finishes.

- 2.2** All paint, polish and necessary materials incorporated in or forming a part thereof shall be subject to the approval and selection for color, tint or finish by the Architect / Engineer.
- 2.3** In connection with the Architect's / Engineer's determination of color or tint of any particular surface, the depth of any color or tint selected or required shall in no instance be a subject for an additional payment to the Contractor.
- 2.4** Where a 'two color' or tint combination may be selected or approved for the treatment of any particular surface in any space or room, no additional payment shall be made thereof to the Contractor in any instance.
- 2.5** Painting / Polishing of wood work and for plaster surfaces shall be minimum 3 coats work over a one coat of primer / Sealer as per manufacture's & specifications except otherwise specified. Painting of metal surfaces required to be painted, shall be minimum 3 coats work, in addition to the shop protection coats.
- 2.6** All paints shall be as manufactured locally and approved by the Engineer and shall be brought on to the site in sealed containers and used without any admixture or adulteration except where recommended in the Manufacturer's printed instructions.
- 2.7** Surfaces of stainless steel, aluminum, bronze, and machines surfaces adjacent to metal work being cleaned or painted shall be protected by effective masking or other suitable means, during the cleaning and painting operations.

3 PREPARATION AND WORKMANSHIP

- 3.1** Prior to start of any work the Contractor shall, as a part of his contract, carefully inspect all surfaces to be painted or finished and notify the Engineer in writing of any defective workmanship, materials, or any other conditions, which in his opinion, will affect the satisfactory execution and /or
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performance of his work. No work in this section shall be initiated until all such surfaces or conditions have been corrected. The absence of any such notification will be construed as an acceptance by the Contractor of all such surfaces and later claims of defects in these surfaces that may result in finished surfaces being unsatisfactory to the Engineer will not in any way relieve the Contractor from the responsibility and/or accountability under his guarantee. No work should be done under the conditions that are unsuitable for the production of good results, nor at any time when the plastering is in progress or is drying, or not dry. Neither paint nor any other finish treatment is to be applied over wet or damp surfaces unless specifically required, nor shall succeeding coats be applied until the preceding coat is thoroughly dry.

- 3.2 Before proceeding with any painting or finishing thorough cleaning and removing of all dust from surfaces, which would affect either the satisfactory execution or permanency of the work is necessary.
- 3.3 All painting materials are to be applied, evenly spread and thoroughly brushed - out only by skilled workers. All workmanship shall be executed in accordance with the best acceptable practices applying to the class of work and grade, type and kinds of materials specified.
- 3.4 Plastered surfaces shall be primed before speckling. After application of primer coat, Contractor shall check all surfaces and do all necessary speckling of cracks, indentations and other imperfections in any approved manner.
- 3.5 Wood work that is to have a finish treatment, whether executed as field work or shop finished, shall be smooth and free from raised grain or other surface imperfections that affect its appearance and shall be lightly sanded or steel woolled during finishing operations. After filler has been applied, if required all nail holes or other similar blemishes shall be carefully stopped with linseed oil putty.
- 3.6 Shop coats provided by others, where required or necessary, shall have all bare spots touched-up by the Contractor, using same materials as used for shop coat, or other equivalent material, if approved by the Engineer.

4. MATERIALS.

- 4.1 All materials shall be stored and mixed only in spaces assigned for this purpose by the Engineer and all necessary precautions shall be taken to prevent fires by complying with all applicable local fire prevention and safety ordinances. The contractor shall provide galvanized iron pans of suitable size in which all mixing paints shall be placed and no mixing shall be permitted outside of these pans.
 - 4.2 The basic materials entering into the compounding and/or manufacture of all paints, polishes and other treatments referenced herein shall be of the best grade and quality of their respective kinds for the intended purposes. These shall be the products or formula of recognized and reputable manufacturers of known reliability and integrity subject to the approval of the Engineer and shall conform to the applicable requirements of the British Standard Specifications or approved local standards regarding kind, quality and finish. Reference herein to specific paint materials is for the sole purposes of establishing a basis of "Minimum Standards" of quality and shall not be construed to be a limit of perfection or quality for any of the materials,
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ingredients to be furnished or utilized in this work. The Engineer reserves the right to select and / or accept only the best grades of standard products, which in his opinion, will provide a finish of recognized performance and characteristics suitable for their respective surfaces, irrespective of minimum standards reference herein.

- 4.3** All materials shall be delivered to premises in their original sealed containers or package bearing the manufacturer's name, label and brand, and be mixed and applied in accordance with manufacturer's directions and /or instructions. The mixing of all paint or other covering finish treatments shall be done in premises as and when, if required, under the supervision and direction of the Engineer,

5. PAINTING TO METAL WORK.

- 5.1** All metal work shall have, in addition to shop primer coats, minimum three (3) coats of enamel paint or as incorporated in the Bill of Quantities, in the manner as specified herein and as per manufacture's, recommendations.
- 5.2** All exposed ornamental and miscellaneous iron and steel shall receive over the shop primer coat, minimum three (3) coats of enamel paints as specified herein or as incorporated in the Bill of Quantities.
- 5.3** Galvanized iron not previously shop coated shall receive minimum 4 coats, the first coat to be of an approved galvanized iron primer and minimum three finish coats of enamel paint or as incorporated in the Bill of Quantities.
- 5.4** Where shop coats and/or priming coats are found to be scratched or abraded they shall be touched up with appropriate paint.

6. OIL BOUND DISTEMPERING.

- 6.1** Distempers shall be of approved quality and make as directed by the Engineer.
- 6.2** Before work of distempering is commenced, the surface should be cleaned. The surface then must be sized with a priming coat of petrifying liquid of approved manufacture. Distemper shall be applied quickly and boldly with broad stiff brushes of approved make. The brush is to be dipped and stroked cross-wise into the walls and then immediately stroked up and down. This shall be considered to be one coat of distempering. The distemper shall be mixed in the manner specified by the manufacturer and each coat shall be inspected and passed by the Engineer before the next coat is applied.
- 6.3** The Contractor shall carry out as many coats as specified in the Schedule of Quantities in accordance with the above specifications and as per manufacture's, recommendations. The number of coats specified are enough for producing the uniform smooth finish and if the finish produced by the Contractor is not up to the satisfaction of the Engineer, the Contractor will be required to apply more coats, as may be required to produce the specified finish without any additional charges.

7. SURFACE PREPARATION AND FILLING.

All plaster and masonry surfaces that are to be finished with vinyl emulsion, plastic emulsion or enamel paint shall be prepared as under prior to application of paint finish.

- 7.1 NEW SURFACES:** Rub down the surfaces with a sand paper or carborandum stone to remove any loose material. Check that the surface is thoroughly dry before painting.
- 7.2 OLD SURFACES:** For previously painted surfaces especially white – washed surfaces, scrape down to the bare surface and ensure that the surface is free from any contaminant like grease, oil, etc. and any loose material or dust is completely removed before painting.
- 7.3 SEALING:** Apply 1 coat of Alkali Resisting Masonry Sealer and allow to dry overnight. Alkali Resisting Masonry Sealer may be thinned with 10-15% good quality mineral turpentine or white spirit if required due to surface absorption .
- 7.4 FILLING :** Putty for filling the walls should be made by mixing 4 parts of good quality chalk and one part of Zinc Oxide Powder with Alkali resisting masonry sealer till a smooth knifing paste is formed. Putty should be applied after sealing the walls with Alkali Resisting Masonry Sealer, and after the filling work is completed and prior to application of the finish paint, the filled surfaces should be dry and properly finished. No filling should be carried out on external surfaces. Each coat of paint shall be allowed to become dry before any subsequent coat is applied. The finished surface shall be free from runs and sags, defective coverage and clogging of lines or angles. Edges of paint adjoining other materials or other colours shall be full and clean – cut without overlapping.

The Contractor shall carry out as many coats as are specified in accordance with the above specifications. The number of coats specified should be enough for producing uniform smooth finish and if the finish produced by the Contractor is not up to the requirement, he will be required to apply as many more coats as may be required to produce the required uniform finish, and no payment for the extra coats applied to produce the desired uniformity will be made.

8. CEMENT BASED PAINTS.

- 8.1** Cement based paint shall be obtained from approved manufacturers. It shall be obtained in sealed tins, which shall be opened in the presence of the Engineer. Only that much quantity of paint should be mixed which can be used in one hour.
- Where required, different colours of cement based paints may have to be mixed together to provide the desired shade. The quantities of the various colours required to give the desired shade will be intimated by the Engineer. These shall be mixed in the manner specified by the manufacturer or as approved by the Engineer after which it must be sieved through 200 mesh sieve.
- 8.2** The surface should be free from dust, dirt, etc., loose material and dirt must be removed by brushing or if necessary by washing and grease, oil paint, varnishes, oil bound distempers, lime wash, etc., shall be completely removed before application of the paint finish.
- 8.3** Paint Material must be mixed in two stages. First by adding a little quantity of water to form a paste and then further quantity of water to get a mix of liquid consistency. In the first stage one measure of water to two similar measures
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of paint must be thoroughly stirred and allowed to stand for 10 minutes. A further measure of water should then be added and thoroughly mixed. This mix must be applied within one hour of the mixing. The lid of the container must be tightly shut immediately after the material has been taken out from it. The surface over which the paint is to be applied shall be thoroughly saturated with water immediately before applying the first coat. The paint shall be applied with brushes of approved make and manufacture. The first coat of paint shall be well scrubbed into the surface by means of brushes and allowed to set for a period of 24 hours. After this, the second coat shall be brushed-in. After two coats have been applied, the surface should present a uniform smooth surface.

9. LACUER POLISHING.

- 9.1** Clear polyurethane lacquer used on the work shall be of ICI / Nippon or an approved make.
- 9.2** The surface to be lacquer polished should be sand papered and a staining compound should be applied if required.

When the stain coat dries up the surface should be rubbed down with sand paper. Approved polyurethane lacquer of a proprietary brand shall then be applied.

The surface shall then be wiped with a dry cloth and the process repeated several times in succession until the surface assumes the desired degree of gloss as approved by the Engineer.

10. SAMPLES.

Prior to the start of the application of any paint and /or finish treatment otherwise, the contractor shall apply samples of the required finish treatments to specific representative wall and ceiling surfaces or other areas or surfaces where indicated by the Engineer. The sizes of the sample paint and finishes shall be as determined by the Engineer.

11. PROTECTION.

The Contractor shall protect all the work against damage or injury by his employees or by the materials, tools used in connection with the work of this contract. Any and all work damages as a result of the execution of this shall be repaired at Contractor's expense or if in the opinion of the Engineer it cannot be properly repaired, it shall be replaced with new work by the Contractor without additional compensation. At all times, the general and liberal use of drop cloths shall be a primary requirement for protection purposes.

12. TOUCHING UP.

At the completion of all work specified herein, all painted work shall be touched up and restored where damaged or defected and the entire work left free from blemishes, to the complete satisfaction of the Engineer.

13. CLEANING.

The Contractor shall clean all paint, spots, dubs, oil and stain from all floors, wood work, glass hardware, metal work, electrical fittings and all similar items, and leave the work in perfect condition, upon completion in every respect to the satisfaction of the Engineer.

14. SCHEDULE OF MEASUREMENT OF PAINT AREA.

- 14.1** Irrespective of prime coats and number of paint coats applied to exposed painting surfaces, area of column, walls, projections, ceilings and other surfaces (except gates, doors, windows and ventilators) shall be measured as

per actual paint surface area for single time only and paid in accordance with quoted rate of Bill of Quantities.

END OF SECTION

TERMITE CONTROL

A. This Section includes the following for termite control:

1. Termite prevention
2. Wood protection

1 TERMITE PREVENTION

- A. Avoid creation of conditions that invite termites wherever possible. Take the following measures:
- B. Remove stumps, roots, wood, and other cellulose materials from the building site before commencing construction.
- C. Remove cellulose materials from around the foundation before final backfill.
- D. Promptly remove form boards and grade stakes used in construction from site.
- E. Allow no contact between building woodwork and soil or fill material.
- F. Locate exterior woodwork a minimum of 15 cm above ground and beams in crawl spaces at least 45 cm above ground to provide ample space to make future inspections.
- G. Make foundation areas accessible for inspection if possible.
- H. If wood that contacts the soil, such as fence posts and foundation elements, use pressure treated wood.
- I. Design ventilation openings in foundations to prevent dead air pockets and to help keep the ground dry.
- J. Direct water away from the structure through proper grading.
- K. Assure that the roof drainage system directs all water away from the foundation.
- L. Avoid plantings near the foundation. Any tree that has the potential to grow to a height of 12 meters or taller shall not be planted within 15 meters of the foundation.

2. **Wood Protection Treatment Application Report: after application of chemical is completed, submit report for Architect's record information, including the following:**

1. Date and time of application.
 2. Brand name and manufacturer of **chemical**.
 3. Quantity of undiluted **chemical** used.
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4. Dilutions, methods, volumes, and rates of application used.
5. Areas of application.
6. Warranty: Special warranty specified in this Section.

2.1 TERMITICIDES

Provide a good termiticide complying with requirements of authorities having jurisdiction, in a soluble or amusable, concentrated formulation that dilutes with water or foaming agent, and formulated to prevent termite infestation for review and acceptance by the Engineer.

Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to the product's Registered Label.

2.2 SAMPLES.

Samples of termicide materials proposed to be used shall be submitted to the Engineer for his approval prior to application or procurement. Samples shall be in original packing from the approved manufacturer.

3. MEASUREMENTS AND PAYMENTS.

- 3.1 General:** No payments shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities.

The cost thereof shall be deemed to be included in the quoted unit rate relevant item in the Bill of Quantities.

END OF SECTION

CARPENTRY AND JOINERY

1. SCOPE OF WORK.

The work covered by this section of specifications consists of providing all labor equipment and materials including performance of all operations in connection with fixing and installation of all wood work and mill work, construction, assembly and surface finish treatment and building in of all cabinet type items, complete in every respect and all related items support, etc., of wood or metal and incidentals, associated wood work appurtenances, the application of all Finish Hardware in connection with finished wood work, strictly in accordance with the requirements and drawings, as specified herein or as required by the Engineer and subject to the terms and conditions of the contract.

2. SUBMITTALS

The Engineer shall approve all samples of the material used for the work under this Section of Specification and same type of material shall be used throughout the work if the Engineer desires to get the material tested, this will be got done by The Contractor at his own cost from a laboratory approved by the Engineer.

2.1 Provide manufacturer's literature completely describing products.

2.2 Provide shop drawings showing door types, details and locations, referred to the door type and hardware group shown on door and hardware schedules.

2.3 Provide certificates stating that doors were constructed with timber of the species specified having moisture content and meeting equilibrium and relative humidity requirements.

2.4 Submit samples of plywood for selection of color and grain.

2.5 Procurement of materials shall be made only after the submittal of shop drawings and samples and their approval by the Engineer.

2.6 MOCK-UP SAMPLE

After approval of shop drawings and tests etc., the contract shall submit at his own cost one mock-up sample of each type of wood works complete with all fixing, fixtures accessories prior to the actual fabrication of the bulk.

The samples shall be returned to the Contractor for incorporation in the works after installation of at least 80% of the works.

3 MATERIALS

3.1 TIMBER

3.1 Hard Wood.

Hard wood shall comprise of Oak, beech, Walnut Mahogany, Teak, iroko and Sheesham.

3.1.2 Softwood:

All soft wood shall consist of pines, spruce, hemlock and Douglas fir or cedrous deodar (referred in the document as deodar), wood locally known as 'Portal' to be used in shutter core where specified.

3.1.3 General Characteristics:

All the timber shall be in accordance with the requirements of BS: 1186, 'Quality of Timber and Workmanship in Joinery'.

The whole of the timber shall be from the heart of sound and fully grown tree, uniform in

substance, straight in fiber, first class quality property seasoned, free from large or loose dead-knots, open shakes and excessive sapwood. The scantlings of all timbers shall be bright, sound and square edged. The moisture content of timber shall not be more than 10 (ten) percent in case of soft wood and 7 (seven) percent in case of hard wood.

3.1.4 Preservation of Wood;

Prior to installation of all finish wood works in their respective positions, preservatives shall be applied to safeguard the woodwork against fungus, termite and bores.

The preservatives shall be of the best available quality as approved by the Engineer. The method of application shall be strictly in accordance with the manufacturer's instructions. The treatment and application of all the preservatives shall comply with the requirements of BS-CP 98:1964,

3.1.5 Adhesive:

The adhesives shall conform to the requirements of BSJ No. 745 "Animal Glues for Wood" shall be as directed and approved by the Engineer.

3.1.6 Nails and Screws:

All nails and screws shall comply with requirements of BSI NO.1202 and BSI NO. 1210 respectively.

3.2 PLYWOOD

The plywood shall comply in all respects with BSI No. 1455:1963. All the plywood shall only be obtained from KDC Board (Pvt.) Limited, Jhelum as approved by the Engineer. All plywood shall be manufactured with phenol formaldehyde or any other approved waterproof adhesive but not with urea formaldehyde.

Plywood used for doors, and other similar works shall be to the thickness and size as shown on the Drawings or as directed by the Engineer. The grade shall be first quality and the face and back shall be free from end joints, dead knots, overlaps, patches and other similar defects. The surfaces shall be free, smooth for painting or polishing.

3.3 MEDIUM DENSITY FIBRE (MDF) BOARD

Medium density fiber board to be used on the project shall be LASANI manufactured by Al-Noor MDF Board Industries of thickness as specified in the drawings. Board shall be manufactured with waterproof resinous glues and shall be guaranteed by the manufacturer. All boards required for the exterior surfaces of cabinets shall be laminated with Formica in approved color and texture in factory as specified elsewhere.

4. GENERAL REQUIREMENTS.

4.1 All materials specified herein shall be the products of one mill as far as possible.

Only first class cabinet type workmanship will be admissible in execution of this work, performed by artisans skilled in this trade, so as to provide cabinet work of the highest grade, quality, finishing, fixing and installation as per drawings.

- 4.2 Care shall be exercised to avoid strong contrasts in color and graining of finished wood for all wood surfaces.
 - 4.3 All cuttings, framing and fitting shall be done as required for accommodation of work of other trades. Use of wood chips, or other shrinkage material for leveling or plumbing will not be permitted in any form. Mortise and tenon joints shall be set in an approved type of glue with wedges and/or pinned. No wood work in the building shall be allowed until such time plastering is entirely dry. As far as practicable, all wood work shall be assembled in shop, painted and finished throughout before fixing/installation in the building.
 - 4.4 In addition to machine sanding, all interior, trim, paneling and wood work shall be smoothened by hand, using ZERO No. sandpaper to give all wood work the required smooth surface for exposed finished treatment and free from machine and tool marks, abrasions, raised grains and other undesirable defects. All wood work shall be fitted to plaster or other finished work in a careful manner so as not to injure these surfaces in any way. Where plaster or other work is damaged or disturbed, it shall be made good and/or restored to its original conditions at the expense of the Contractor.
 - 4.5 The whole of the timber shall be of good quality, properly seasoned, "free from large, loose or dead, knots, or tight knots, the diameter of which exceeds one quarter of the width of the exposed face, or one inch whichever is less, or injurious open shakes" and shall not contain sap wood and having a moisture content of not more than 15 percent, nor less than 12 percent of the dry weight at the time of fixing.
 - 4.6 All work shall be accurately set out and properly framed together with close fitting mortise and tenon joints accurately cut and carefully fitted and wedged solid in the best and most substantial manner. The joinery work shall be started after the commencement of the construction of the building but not wedged up until required, for fixing in position within the building. No joinery shall be wedged or built into position until it has been accepted and approved by the Engineer.
 - 4.7 Door frames built into the structure before the surrounding carcass is built shall be set plumb & true and shall be adequately braced and protected against damage during subsequent building operations.
 - 4.8 All timber shall be of first class soft wood except those specified in the Bill of Quantities and as shown on the drawings.
 - 4.9 Plywood used for doors, paneling and other similar works shall be shown on the drawings or directed by the Engineer. The grade shall be first quality and the face and back shall be free from end joints, dead knots, overlaps, patches and other similar defects. The surfaces shall be free, smooth for painting or polishing. The veneer shall be of the required thickness and quality including base veneer and shall be impregnated with on approved adhesive and machine compressed.
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Such machine pressed veneered wood shall be fixed on all sides of the inner core wood (soft wood of approved quality) after it has been treated with water resistant hot setting glue.

5. DOOR AND WINDOW FRAMES.

- 5.1 The door and window frames shall be of the first class soft wood or hard wood as specified in the Bill of Quantities and description of works. These shall be fabricated to the exact sizes and dimensions as provided in the drawings. Where the door frames are not to have any sills, the vertical length shall be embedded in the floor. The Contractor shall also fully protect door and window frames from damage or injury during construction and shall replace the damaged or injured frames at his own cost. The frames must have primary coat painted on or before fixing. All framing members shall be properly mortised, tenoned and all joints properly wedged and glued and pinned. The door and window frames shall be secured in place by means of galvanized steel anchors bent up against the back of the jambs and screwed in place and built into the masonry as it is being constructed. There shall be one such anchor near the top and bottom of each jamb not over 90 cms intervals between the top and bottom anchors. Frames shall be secured to the anchors by means of two counter-sunk screws per anchor.
- 5.2 Wherever the drawings and Bill of Quantities require door and/or frame of metal, these shall be constructed of prime quality galvanized steel of 16 swg unless otherwise specified. The width and shape shall be as indicated on drawings. The frames shall be recessed at the point of location of hinges and shall have integral reinforcement to allow the butt hinges, pivot hinges, door closers and other finish hardware to be screwed on. The door frames shall also have a provision to allow recessed installation of door lock strike plate with a back up boxing to keep concrete away from the lock strike plate. The number and type of anchors shall be as per wooden frames. These anchors must not be welded onto the inner side of the exposed surface of the frames as indicated in the drawings. Under no circumstances must the Contractor manufacture the metal frames prior to approval of a sample by the Architect/Engineer. The protection of the metal frames from the plastered surface if shown on the drawings must be uniform throughout the project.

6. FLUSH WOOD DOOR SHUTTERS.

- 6.1 The door leaf has to be flush type on both sides manufactured as approved. It shall be of well-seasoned solid core block board. Flush door shall be screwed to the frames by means of butt hinges. Hinges where provided shall be countersunk in the order for veneered leaves shall intimate the Engineer and also a sample of the leaf of the proposed manufacturer. Completed doors shall be sound, rigid and free from defects and warp. All edges shall be aligned and smooth. Joints shall be close fittings, hardwood doweled or mortised frames and of a strength to maintain the structural properties of the members connected. All adjoining faces and edges shall be flush and smooth. Edges shall be rectangular and solid. If alipping is required on the edges of the flush door shutter, this shall be of the required size and shall be recessed and glued and nailed into the edge frame of the shutter.

7. GLAZED DOORS AND WINDOWS.

- 7.1 All doors and window leaves shall be cut out and framed together as soon as possible after the commencement of the works and stacked in the shade for seasoning. These are not to be wedged and glued for four months where possible and where the contract time permits. If it is not possible, these should

be wedged and glued just prior to being hung. Any or all portions, in which defects appear shall be replaced by the contractor before final gluing up the same. All tennons at the final assembly of the doors (top and bottom) shall be glued and wedged. Immediately after gluing, the frames shall be tightly clamped and so left till the glue has set. Unless otherwise specified, leaves are to be hung on hinges of the size and numbers required. The hinges shall be countersunk into the frames as well as in the leaf, the recesses being cut of the exact size and depth of the hinges. No subsequent packing shall be allowed.

8. WOODEN HAND RAIL.

The wooden hand-rail shall be in accordance with the dimensions and shape shown in the drawings. It shall be fixed to the balustrades with counter screws at maximum 250mm centers or with bolts in an approved manner and the top neatly covered in with an appropriate wood stopper.

The wood shall be carefully selected and shall be free from all knots in addition to conforming to the specifications for wood work section.

9. WOODEN CABINETS.

All cabinets including fittings and fixtures shall be as approved and shall be of best quality.

9.1 The Contractor shall submit a finished sample of each type of cabinet including all fittings and fixtures and the same shall be got approved from the Engineer before fabrication. Samples of materials to be used in cabinets together with specifications and literature shall be supplied to the Architect for his approval. The color shade shall be as approved.

9.2 All cabinets shall be installed in position by the skilled workmen. The Contractor shall inspect delivered cabinets and related parts for indication of location, size required by field measurements, finishing hardware and similar preliminary works. Verify locations for installation, required floor and wall finishes, painting and all other related work. Unsatisfactory conditions shall be repaired. Concealed fasteners, all joints surfaces shall be smooth and even. Doors and other moving parts shall exactly fit in the frame. Refit, as necessary to ensure proper and easy operations. Refit, if necessary, all cabinet hardware, test for proper operation, remove for painting and other finishing and properly replace in position with all fittings and accessories. All work shall be thoroughly protected from damage at all times by suitable methods approved by the Engineer. Adjacent work shall similarly be protected from damage. Any damage or disfigurement shall be immediately made good at Contractor's expense.

10. WOOD SKIRTING/DADO AND PANELLING.

Wood skirting/dado and paneling shall be provided where shown on the drawings and the schedule of finishes. These shall be installed in position conforming to detailed drawings and as per direction of the Engineer. Shop drawings and sample shall be submitted to the Engineer for approval. In the event of non-conformance to specifications and drawings, the work shall be rejected by the Engineer and the Contractor shall remove and replace the rejected work by new work as per specification.

Surfaces shall be prepared in the manner as directed by the Engineer for clear polish finish or as specified.

11. HARDWARE.

Hardware shall be of best quality and make, strong and fine finished according to the weight/dimension, material as per specified hardware schedule. The Contractor

shall obtain prior approval from the Architect for quality, shape, pattern and brand of all hardware materials by providing samples and catalogue etc. and shall provide and fix only the approved hardware materials.

Hardware shall be carefully and securely fitted. Upon handing over the work, hardware shall be demonstrated to operate freely. Keys shall be placed into respective locks and upon acceptance of the work keys shall be tagged and delivered to the Engineer.

11. MEASUREMENT AND PAYMENT.

- 11.1 Except otherwise specified herein or else where in the Contract Documents, no measurement and payment will be made for the under mentioned specified works related to the relevant items of the Bill of Quantities. The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

All finished hardware/ fittings in carpentry and joinery works.

Glass and glazing including other materials and accessories required for installation and finishing.

Prime coat, painting and polish in carpentry and joinery

works. Adhesives.

Fittings and fixtures for moveable panels.

- 11.2 Measurement of acceptably completed works of all units will be made on the basis of net actual area in square meter / square feet or length in meter / feet fabricated and installed in position as shown on the drawings or as directed by the Engineer.

- 11.3 Payment will be made for acceptable measured quantity of all units on the basis of unit rate quoted in the bill of quantities and shall constitute full compensation for all the works related to the item.

END OF SECTION

LIST OF APPROVE MANUFACTURERS

S.NO	ITEM	APPROVED MAKE
1	Split AC (T-3 Compressor)	1. MIDEA (China) 2. TCL (China) 3. Gree (China) 4. Approved Equal
2	UPVC Pipe	1. Dadex 2. AGM 3. Steelex 4. Approved Equal
3	Electric Cables & Wires	1. Pakistan Cables 2. Fast Cable 3. Approved Equal
4	G.I Sheet	1. Pakistan steel 2. Imported
5	Breaker, Relay, Switches & fuses	1. ABB 2. Schneider 3. Siemens 4. Approved Equal
6	Concrete Fasteners & anchors	1. Hilti 2. Silka 3. Index 4. Approved Equal
7	Vapour Barrier Coating	1. Foster 2. Zahabiya 3. Approved Equal
8	Paints	1. ICI 2. Berger 3. Approved Equal
19	Air devices	1. Steel craft 2. EAP 3. Green Air 4. Approved Equal
10	Refrigerant pipes	1. Mueller (USA) Approved Equal
11	Insulation Pipe and Duct	1. Aeroflex (Thailand) 2. Aerofoam (UAE) Approved Equal
12	Ventilation fans	1- S&P 2- BVN 3- SODICA Approved equal

IMPORTANT NOTE:

- 1- All the materials supplied under this contract shall be from one of the manufacturer listed below or subject to approval provided the contractor provide alternative list during the tender submission.
- 2- Materials proposed from listed Makers also must fully comply with Details Specifications. Country of Origin, where listed, must be complied.
- 3- All material shall be of class 1 quality, purchased from approved authorized dealer, sole importers & good shops.
- 4- In case of "Approved Equivalent", it shall be at the discretion of the Consultant to accept or reject the alternate proposal submitted by the Contractor

S.NO	ITEM	APPROVED MAKE
PLUMBING SYSTEM		
1	Geyser	1- Nasgas 2- Singer 3- Approved Equal
2	UPVC Pipe	1. Dadex 2. Hepworth Approved Equal
3	Concrete Fasteners & anchors	1. Hilti 2. Sikla 3. Fisher Approved Equal
4	Paints	1. ICI (Pakistan) 2. Berger (Pakistan)
5	W.C	1. Porta 2. Master approved equal
6	Wash Basin	
7	CP Tee Valve	
8	Muslim Shower	
9	C.P. Bottle Trap	1. Porta 2. Master 3. Approved equal
10	PPR PN20 Pipe	1. Dadex 2. Hepworth 3. Approved Equal
11	Manhole Frames, Covers & Gratings	1. Stanton 2. RBA-Ferro 3. Approved Equal
12	Water Pumps.	1- Pidrollo 2- Pantex 3- Grundfos 4- Approved Equal
13	Plumbing Valves	1- GALA 2- Kitz 3- Approved Equal
14	Floor drain & C.O.P	1. Aqua 2. Kabal 3. Approved Equal

IMPORTANT NOTE:

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PAKISTAN SECURITY PRINTING PRESS CORPORATION (PSPC) KARACHI

TENDER PACKAGE

ELECTRICAL & SECURITY EQUIPMENT'S

TECHNICAL SPECIFICATION

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SECTION - 01

GENERAL REQUIREMENTS OF ELECTRICAL WORKS

1.1 General

:

This section outlines the general requirements, standards, and obligations for all electrical works, including design, supply, installation, testing, commissioning, and protection of electrical systems, to ensure compliance with project specifications, safety regulations, and approved drawings.

The specifications are general and the description given in the various documents of Contract including Bill of Quantities shall be followed. Details and instructions given on the drawings, however, shall have precedence over both the Technical Specifications and the Bill of Quantities, and the drawings shall be read together with the Technical Specifications and any detailed Particulars provided.

The Specifications shall be considered as an integral document with others to cover the furnishing of the specified materials, labour, tools and plants, appliances and consumable material necessary for all work required to complete the contract.

Scope of Work

The work under these specifications includes providing of materials and equipment and performing all the works necessary for complete execution of all the electrical work as per electrical and general construction drawings as herein specified or both, until and unless otherwise specifically excluded and which, without excluding the generality of the foregoing, shall include but not be limited to the following principal items of work-

- a) Arrangement of LV Power Supply.
- b) Laying of LV Underground Feeders.
- c) Installation of Street Lighting System.
- d) IP CCTV Surveillance System
- e) Installation of complete Earthing System.
- f) Associated Civil Works.
- g) Testing & Commissioning all Electrical Equipment.

All allied and small works and materials, even if not specifically mentioned in the specification and BOQ but required for completeness of the job, shall be deemed to have been included in the contract / BOQ.

1.2 General Requirements

The Contractor shall carry out all the work in accordance with the specification and in conformity with the Electricity Act and Rules as adopted in Pakistan and the latest edition of the KE, IEC & British Standard Specifications or as specified herein. Where these specifications differ from the rules stated above, these specifications shall be followed.

- a) If during preparation of the bid, the Contractor finds any error, discrepancies, omission, ambiguity uncertainty that needs clarification, the same shall be referred to the

Client/Engineer/Consultant.

- b) The specifications indicated herein do not provide complete details of construction, materials and equipment to be furnished under this contract, but only broadly indicate the type and functioning of the same. A Schedule of Technical Particulars of major equipment, however, is included.
- c) The Contractor will make his own site survey to ascertain and confirm layout and exact location of equipment as shown on the drawings.

- d) 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.
- e) The Contractor shall familiarize himself with all requirements such as the permits, license, fees, and codes and arrange to comply with these. It will be the Contractor's responsibility to give the required notices to the local electrical authorities, and assist the Pakistan Security Printing Corporation (PSPC) in getting electrical connection as also the acceptance of the installation by the Electrical Inspector of the concern authorities.
- f) Any installation not complying with the specification shall be corrected/ replaced.
- g) It shall be the responsibility of the Contractor to protect equipment and materials (installed or stored) from damage till final taking over by the procuring agency.
- h) The materials shall be purchased from approved contractor.
- i) The Contractor shall produce comprehensive documentation of individual testing, calibration and installation together with an overall record of the state of completion to the client as per tender conditions.
- j) It will be the responsibility of the Contractor to coordinate between other agencies and Engineer and shall accommodate other utilities/services.
- k) The work shall be carried out in accordance with the KE, BSS, IEC and IEE. Rules and Regulations as adopted in Pakistan, to satisfy the requirements of the Client/Engineer.
- l) The Contractor shall ensure at his own cost the permanent availability of this specification, drawings and Contract agreement on site.
- m) The quantities set out in the bill of quantities are the estimated quantities and they shall not be taken as actual and correct quantities of work to be executed by the Contractor. The Contractor shall carry out work as per approved drawings.
- n) The Contractor shall cooperate in every way, and work with all other Contractors to whose apparatus he shall connect parts of his work and also provide in his work connections and facilities for the connections of the said other Contractor's work.
- o) The Contractor shall prepare drawings/details of his electrical equipment, location of sleeves, inserts, and supports as may be required, and coordination of his work with other trades. Upon demand he shall furnish in adequate numbers these drawings for the information of all parties concerned, and approval of these drawings shall not relieve the Contractor in any way from the responsibility of properly locating and coordinating his work with the works of others.
- p) The Contractor shall during the progress of work, keep a careful record of all changes where the actual installation differs from that shown on the Contractor drawings. The Contractor shall in a neat and accurate manner, make a complete record of all changes and revisions to the original design, as installed in the completed work. These drawings shall be submitted for approval. Final payment will be withheld till receipt of the approved record drawings

- q) The specifications and the drawings are based on electrical systems and apparatus terminology defined in the Rules of the Institutions of Electrical Engineer UK and the Indian Electricity Act and Rules as adopted in Pakistan and if some clarification is required in any instance a reference shall be made to the Engineer whose instructions shall be binding and final.

1.3 **Codes and Standards**

The whole of the work shall be carried out in strict accordance with International and Local regulations for the Installation of Electrical Equipment.

- a) The latest published rules of the Electrical Code, so far as applicable to the work, British Standards (BS), International Electro Technical Commission (IEC), Institute of Electrical Engineers (IEE) and KE Standards. Rules and Regulations of Provincial/Local Authorities shall be considered included as part of these specifications and all their requirements shall be fully met.
- b) It shall be the responsibility of the Contractor to test all systems of the entire electrical installation as well as those installations where sequence in operation is required. The electrical contractor shall test for proper sequence and he shall leave the entire electrical installation in satisfactory working condition.
- c) The Contractor shall guarantee that the electrical systems including all components and accessories used therein are free of all grounds, shorts and open circuit faults, defective workmanship and materials.
- d) All electrical installation in "Explosion Hazardous Zones" should comply with the "Institute of Petroleum Model Code of Safe Practice Part - I Electrical".

1.4 **Alterations**

- a) The location of various items indicated on the drawings are presumed to be approximately correct, but it is to be understood, however, that the small scale drawings are necessarily diagrammatic and that such locations as are shown, are subject to slight revision, as the work is installed, which may be necessary to accommodate local construction condition or interference with other services. No major changes shall be made without approval (in writing) of the Engineer. On obtaining approval, the position of any point may be altered without extra charge being made. The location of equipments shown in plans should be considered as approximately correct.
- b) The Engineer will have full power and authority to instruct the Contractor from time to time for any alterations during the progress of the works as shall be necessary for the purpose of the proper and adequate execution and maintenance of the works. The Contractor shall comply all such works and be bound by the same.

1.5 **Material and Workmanship**

- a) All materials shall be in accordance as per international Standard or specified as per types and manufacture described in the specifications, Bill of Quantities, and or shown in relevant drawings. Where the Contractor desires to use materials differing from those described he shall obtain the approval of the Engineer in writing before tendering.
- b) ANSI & NEMA materials shall accord with the appropriate Pakistan, and British Standard Specifications. Rights are reserved to inspect materials on site at reasonable times and to reject any material not complying with the specifications. The cost of any dismantling and re-erection of the installation occasioned by the removal of rejected materials shall be borne by the Contractor.

- c) During the time of the contract and before final approval of the installation contractor will be submit four copies of descriptive literature, maintenance and operation data and parts list of each item of electrical equipment installed under this contract to the Engineer.
- d) All electrical materials shall be new and shall meet the requirements of BS/IEC/KE Standard Specifications (whatever required). As soon as practicable and within 30 days after the award of the contract and before any materials and equipment is ordered, the Contractor shall submit for approval complete list of materials, apparatus, and equipment in triplicate, giving the manufacturer's name, address, descriptive data, trade name of items, rated capacities, certified analysis, catalogue, etc. and when called upon to do so complete specifications and cut or drawing of each item or whole or portion of list, as required, which he proposes to use or install.
- e) The Engineer may require the Contractor to submit samples of materials or any other items specified in the BOQ.
- f) Wherever the words for 'approval' or 'approved' (size, arrangement, type etc.) are used, especially with regard to the manufactured specialties etc. or wherever it is desired to substitute a different ma or type of apparatus for that specified, all information pertinent to the adequacy and adaptability of proposed apparatus shall be submitted to the Engineer and his approval secured before the apparatus is ordered or installed.
- g) The work throughout shall be executed in the best and most thorough manner under the direction of the Engineer. Rights are reserved to reject any work or material which are not in full accordance with the drawings and specifications, and shall have the power to reject any work and material which, in his judgment, are into in full accordance therewith.
- h) The electrical plans as draw are based on the architectural plans and details, and show conditions as accurately as possible to show them in scale. The plans are diagrammatic and do not necessarily show all fittings etc. The locations of apparatus, and appliances shown on the plans are approximate. The Contractor shall be responsible for proper location of the works in order to make them compatible with the architectural details and the instructions given at site.

1.6 **Equipments Transportation & Storage:**

A packing list of all the equipment and material in a package along with its site storage instructions, if any, shall be supplied. All containers, planking, covering, bases etc shall become the property of the Client, after the package has been opened and equipment removed. The Contractor shall arrange for the transportation and storage of material suitably at site to the approval of the Consultant / Engineer.

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.

1.7 **Civil Works**

- a) The Contractor shall furnish to the proper trades all inserts, anchors, sleeves or other required items which are to be built in by them for securing hangers or other supports of conduits and for an anchorage for electrical apparatus and equipment, and supervise the placing of these inserts, anchors etc.
- b) Trench/Channel sills for leveling and support of all floor mounted and Pad mounted electrical equipment shall be provided as part of the electrical work. Where an item of floor mounted Pad mounted equipment is to be installed, floor/pad and deck loading shall be check. If it is found that permissible loadings are exceeded by direct application of the equipment to the pad/slab or deck suitable tonnage as approved shall be provided as part of the electrical work.
- c) All necessary concrete foundations, pads, and bases for lighting masts, or other electrical equipment installed as part of the electrical work including such bases or foundations as detailed on electrical drawings.
- d) Supporting methods for all electrical equipment and circuitry shall conform to the best practice as per BSS and shall utilize only approved materials.

1.8 **Inspection, Acceptance & Rejection**

The Engineer rights are reserved to arrange inspection of all or any of the items prior to their shipment at the site or factory of the manufacturer and the Contractor shall provide necessary access and facilities with his manufacturer. Engineer rights are also reserved to reject defective material or require its correction at any time before, during or after fabrication or manufacturer.

Rejected materials and equipment shall be satisfactorily corrected and rejected items shall be satisfactorily replaced with proper material without charge thereof for any replacement costs, shipping charges or handling upto the point of delivery or point of rejection.

The Contractor shall furnish promptly without additional charge all reasonable facilities, labour and assistance for the safe and convenient inspection and / or tests which may be required. All inspection and tests be performed in such a manner as to avoid unnecessary delay of the work. The Contractor shall furnish as soon as possible two un-priced copies of all orders placed outside for articles and materials to be incorporated in the work. The orders in all cases shall carry a notation to the effect that the articles or materials are subject to inspection and acceptance. The inspection may be during manufacture or before or after delivery at the site of work.

Rights are reserved at all times and places to reject articles or materials to be furnished hereunder which, in any respect fail to meet the requirements of these specifications, regardless of whether the defects in such articles or materials are detected at the point of manufacturer or after delivery to the site. If the Engineer through an oversight or otherwise has accepted unsuitable materials, no matter in what stage or condition of manufacture, or delivery, said materials may be rejected. Compliance with the specifications is the responsibility of the Contractor and shall not be voided by any act or omission on the part of the Engineer's inspection. No inspection or acceptance of or payment for any of the material described herein shall relieve or release the Contractor from any obligation pertaining to the contract.

1.9 **Testing and Guarantee**

1.9.1 General

All type and routine tests on switchgear and all other equipment shall be performed at the manufacturer's works in the presence of the Engineer or his Representative. Type tests may be waived off in case test certificates as certified by an approved standard laboratory of international repute approved by the Engineer are submitted but merely producing the type test certificates shall not relieve the Contractor to carry out the required standard/routine tests.

The Contractor shall inform the Engineer about the date and time of test of each equipment at least two weeks in advance. The witnessing of test by the Engineer or his representative shall not absolve the Contractor from his responsibility for the proper functioning of the equipment, and for furnishing the guarantees.

1.9.2 Completion Tests

After any equipment has been tested, check 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 do not cause any damage to the already tested equipment.

1.9.3 Test Certificates to be furnished by the Contractor

After all tests have been carried at the manufacturer's works the Contractor shall furnish test certificates for the following Electrical systems.

- LV Switchgear
- LV Cables
- Main /Sub Main Distribution Panel
- Street light Control Panel

1.9.4 Expenses to be borne by the Contractor

All expenses i.e. traveling, boarding and lodging for carrying out the tests and witnessing by the Engineer / his Representative and the Employer's Representative shall be borne by the Contractor and are deemed to have been included in the tender bid.

1.9.5 Payment

No separate payment shall be made for work involved within the scope of this section, unless specifically mentioned in the respective items of Bill of Quantities.

1.9.6 Guarantee

The Contractor shall guarantee that the electrical systems provided are free from all flaws and any kind of defective workmanship and material, and will remain so for a period one year from date of acceptance of the work. Any defect appearing within this period shall be remedied by the Contractor at his own expenses.

- a) The Contractor shall indemnify and save harmless the Employer and the Engineer/ Engineer representative from and against all liabilities for damages arising from injuries to persons or property occasioned by any act or omission of the Contractor or any of his sub-Contractor, including any and all expenses, legal or otherwise, which may be incurred by the Employer or the Engineer in the defense of any claim, action or suit.

- b) The Contractor shall be fully responsible for the work of any supplier or manufacturer, as it is intended that the entire electrical and allied works forming part of this Contract when finally delivered to the Employer shall be ready in every respect for satisfactory operation.
- c) The Contractor shall furnish as soon as possible two un priced copies of all orders placed outside for equipment to be used in the project. The orders in all cases shall carry a notation to the effect that the equipment are subject to inspection and acceptance. The inspection may be either during manufacture or before or after deliver at site. The Contractor shall furnish to the Engineer full information as to the progress of work on said orders, and shall advise in writing at least 21 days prior to the equipment being ready for inspection at the point of origin.

1.10 **Protection of Work**

The Contractor shall effectively protect the work from damage during execution and as may be necessary, after installation and he shall likewise protect adjoining work of other Contractor's from damage resulting from installation of electrical work.

Such precaution as are necessary must be tan to properly protect all apparatus, fixtures, appliances, materials, equipment and installation from damage of any kind. Failure to provide such protection to the entire satisfaction of Engineer shall be sufficient cause for the rejection of any particular piece or pieces of the same.

The Contractor shall be responsible for the protection of adjoining existing works (already carried out by other contractors) and shall take all necessary precautions to avoid damage. The Contractor shall repair or replace all existing infrastructure (e.g., curbs, sidewalks, fences, utilities, street surfaces, structures etc.) damaged as a result of his operations. Repairs and replacements shall be as per existing work on site, duly matched to finish and dimension as per the direction and satisfaction of the Engineer. All costs incurred for protecting, removing and restoring such work shall be at Contractor's own risk and cost.

1.11 **Foundations, Pads, Bases, Supports & Fasteners**

All necessary concrete foundations, pads and bases for lighting poles and Electrical equipment installed shall be part of the electrical works including such bases or foundations as detailed in Miscellaneous drawings, shall be provided as part of the electrical work. Supporting methods for all electrical equipment and circuitry will conform to the best practice, shall utilize only approved materials and shall be in accordance with the standards as published by the BS Codes of Practice or specified in Technical Specification.

1.12 **KE Requirement**

The Contractor shall liaise with KE and carry out necessary formalities, if required. Any special requirement of KE shall be complied with by the Contractor.

1.13 **PTCL Requirement**

ICT installations for the PSPC site shall be carried out based on verified existing installation information, the Contractor of this Contract package shall be fully responsible for obtaining and coordinate for the exact approved routes / location of ICT Conduit, Manhole & Handhole from the ICT designer before the execution of Electrical works to avoid the conflict of work.

1.14 **Completeness of the Job**

Each item of work has been, as far as possible, fully described and included in these Specifications, Drawings and the Bill of Quantities. However, the supply and installation of any item shall be deemed to include all requirements necessary for the full completion of the work in accordance with the tender, and shall be considered accounted for in the supply/installation of the equipment, unless specifically excluded.

These specifications cover the complete supply installation, testing and commissioning of all electrical works, unless otherwise stated, so as to obtain a complete functioning system for which all sundries such as hooks, hangers, supports, small wiring of components of electrical panel boards, foundations for machinery and/or other such necessary accessories that are essential are deemed to be included in the Contractor's bid price. Each item of work has been, as far as possible, fully described and included in these specifications, drawings and Bill of Quantities.

1.15 **Drawing and data to be furnished by the contractor**

a) **Shop Drawings:**

The location, routing and installation heights of the equipment etc., which are given on the detailed approved drawings, are approximate. Based on site conditions, and in coordination with civil, mechanical, and manufacturers drawings, the Contractor shall prepare shop drawings showing proposed routes of raceway and positions of equipment, including mounting and fixing details and submit the same to Consultant / Engineer for approval. However, if due to any reason the Contractor desires to later alter the approved locations, routing, etc, he may do so after obtaining the written approval of the Consultant / Engineer. All the detailed planning for electrical system including Conduit, Cable routes and Electrical Equipments location etc. shall be carried out well in advance of the actual execution of work, by the Contractor to the satisfaction of the client. For this purpose, the Contractor shall prepare "Shop drawings" prior to installation duly coordinated with other services and submit to the Engineer for approval.

b) **As-built Drawings:**

Upon completion of the work, the Contractor shall furnish a complete set of drawings in a neat and accurate manner, showing the work in complete details as installed. Clearly annotated As-Built electrical drawings and diagrams shall be maintained up to date on site on completion of the project. The contractor will be furnished of the entire installation, system and equipment for safety and operating controls in schematic form. These completion drawings shall then be scrutinized and finalized by the Consultant /Engineer and thereafter Contractor shall submit four (4) sets of "As built" drawings to the Engineer.

c) **Operation and maintenance manuals**

The contractor shall submit the operation & maintenance manual for all equipments, which were supplied by vendors. The completion of document and preparing a comprehensive manual shall be the responsibility of Contractor.

SECTION- 02

BUILDING INTERNAL ELECTRICAL WIRING & ACCESSORIES

1.0 GENERAL

- 1.1. The work under this section consists of supplying, installation, and commissioning of all material and services of the complete wiring devices such as switches, sockets and accessories as specified herein and/or shown on Tender Drawings and stated in the Bill of Quantities
- 1.2. The internal electrification will comprise of providing luminaries, switches, socket outlets and distribution boards and their associated wiring minimum through 20 mm dia PVC conduit embedded in concrete, recessed in wall or laid in floor as shown on the drawings.
- 1.3. Before start of work, the Contractor shall submit shop drawing & obtain approval of the Engineer of the detailed wiring diagram showing details of circuits and light points The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at site with other services for exact location, mounting and position of the electrical devices.

2.0 STANDARDS AND CODES

- 2.1 The following Codes and Standards to the extent specified herein form a part of this specification. When an edition date is not indicated for a Code or Standard the latest edition enforced at the time of proposal submitted shall apply:
 - a) BS546 Specification, two pole and earthing pin, plugs and socket outlets
 - b) BS646 Specification, cartridge fuse link
 - c) BS1363 13A plugs, socket outlets, connection units and adaptor
 - d) BS3676 Switches for household and similar fixed electrical installation
 - e) BS5733 Specification for general requirements for electrical accessories
 - f) EN60309-2 Specification for industrial plugs, socket and couplers for AC supplies
 - g) IEC 61200 Electrical Installation guide
 - h) IEC 60309 Plugs, Socket-Outlets and Couplers for industrial purpose
 - i) IEC 60670 Boxes and Enclosures for Electrical Accessories
 - j) IEEE 404 Standard for Power Cable joints
 - k) UL 486A Wire connectors and soldering lugs for use with copper conductors

3.0 SUBMITALLS

- 3.1 The contractor shall submit the following drawings and documents related with each electrical system for consultant approval:
 - a) Original catalogues for various proposed components.
 - b) Shop drawings and any special tools shall be provided before installation.
 - c) Samples of electrical materials to be installed.
 - d) Factory Test Reports.
 - e) Schedule of Accessories and Fittings.
 - f) ~~Field Test Certificates.~~

4.0 LIGHT CONTROLLED SWITCHES

Switches controlling light points shall be suitable for 250V, 50Hz AC supply, with a current rating of 10A unless otherwise specified. Switches shall be of gang type, one-way or two-way, single-pole or double-pole, as indicated on the drawings. Where more than one switch is indicated at any position multiple gang units shall be used.

The body of the switch shall be of plastic or Bakelite, suitable for flush or surface mounting in a sheet steel outlet box. The switch contacts shall be silver tipped and these shall provide snap action. The switch shall be in white colour. The switch shall be gang type. The gang switches shall be made of molded plastic with a white plastic faceplate.

The surface or flush switches shall be mounted in 18 SWG sheet steel box of appropriate size and fixed on surface/recessed in wall, column or surface. All sheet steel outlet boxes shall be painted and have conduit entry holes for 20mm dia PVC conduit and earth terminal for connecting earth continuity copper conductor

5.0 SWITCH SOCKET OUTLET

Switch socket outlet shall be 3 pin rated for 13/16 amps or 20 amps at 250 volts, 50 Hz as specified. Flush type or surface, white in colour. These shall be moulded type with white plastic faceplate and suitable for mounting on surface or recessed in wall or column on 18 SWG sheet steel box of appropriate size.

Each socket outlet shall be provided with an individual control switch mounted on the front plate. The sheet steel back box shall have 20mm diameter conduit entry holes and shall not be less than 35mm in depth. The box shall also be provided with a suitable earth terminal for connection of the earth continuity copper conductor.

Switch socket outlet in kitchen and plant rooms/services rooms and above false ceiling shall be provided with pilot lamp.

Socket outlets installed in flush installations shall have overlapping front plates.

In surface installations front plates shall be flush with the sides of the box and shall be metal clad unless otherwise specified.

The earth pin of the socket shall be connected to the box earth terminal with a green and yellow PVC-insulated protective conductor. Cover screws are not acceptable for earth continuity.

Socket outlets for voltages other than 240V for single phase and 415 for three phase supply shall be color coded in accordance to be BSEN60309-2 and shall allow plugging of only similar rated voltages plugs.

All floor mounted socket outlets shall be fixed as part of the under floor trunking service boxes. Socket outlet shall be suitable for back and side wiring with standard conductors.

5.1 Weatherproof Socket:

- a) The weatherproof 2 gang socket shall be mounted in an IP66 weatherproof gasketed, polycarbonate, high impact resistance housing.
- b) The weatherproof integrity shall not be affected plugs are inserted.

5.2 Industrial Socket:

- a) The Socket shall be manufactured to IEC 60309. The Sockets shall be rated as per Design drawings.
- b) Socket used in Industrial areas shall be heavy duty type with enclosure confirming to IP 52 indoors and IP67 outdoors of IEC 60529.
- c) Sockets shall be mechanically interlocked with plug to prevent removal or insertion of plug when receptacle is live.

Sockets shall be mounted in boxes or assemblies designed for the purpose. Such boxes or assemblies shall be securely fastened in place.

Before installing sockets in the boxes, clean electrical boxes of dirt and debris.

Sockets mounted in boxes that are either flush with the wall surface or projecting from it, shall be installed so that the socket is held rigidly against the box or raised box cover.

Sockets shall be securely held in place by a minimum of two screws.

Sockets shall be installed so as to completely cover the opening and seat against the mounting surface. Weatherproof gasketed covers shall be provided for weatherproof sockets.

Sockets in plant room, switch room or similar areas where surface conduits are installed shall be metal clad.

5.3 Floor service box:

Floor Service Boxes shall be two-compartment type of the size 300 x 300 x 75-90mm and shall be constructed from high-pressure Zinc Alloy die casting base frame pillars.

This shall be fixed on to heavy gauge galvanized steel base plate for support-by-support frame. Other materials adequate in strength and performance shall be used and these shall be protected against corrosion.

Cover for floor service boxes shall be made of high-pressure zinc alloy die casting provided with suitable hinges designed to enable the trap cover to open through 180 degrees and giving access at all times to the power and telephone outlets.

All boxes shall have extra wide gaskets in order to minimize water seepage. Gaskets shall be made of material that is durable in order to withstand loads.

Adequate segregation shall be provided between service runs within boxes by using cross-over bridges and rigid compartments.

Circuit protective conductors shall be provided between the covers and the boxes.

Cable emerging for service boxes shall be protected against damage by means of nylon cables exit grommets or equivalent and shall be reversible to close position when not in use.

Interior of boxes shall be cleaned to remove dust, debris and other material. Exposed surfaces shall also be cleaned and the finish restored.

6.0 WIRES FOR CONDUIT WIRING

The wiring in the building shall be carried out in PVC conduit installed on the surface or concealed as shown on the drawings.

The cables for conduit wiring shall be single core of stranded copper conductor, PVC insulated and tested to BSS 6004, 1961 and manufactured by approved make. The voltage grade shall be 450/750 volts. The circuit on two different phases shall not be drawn through the same conduit. All circuit wiring shall be tagged by R,Y,B. phases. The wires shall be colour coded to ensure correct identification. The circuits containing lighting & socket outlet etc. shall be controlled by MCB installed in distribution board.

- 13/16 Amp. Power socket: Wiring shall be in separate conduit direct from distribution board to the individual socket with 3x2.5 mm² single core PVC insulated cable.
- 20 Amp. Power socket: Wiring shall be in separate conduit direct from distribution board to the individual socket with 3x4 mm² single core PVC insulated cable.
- Point wiring: shall be in PVC conduit direct from switch board to the individual light fixture with 3x1.5 mm² single core PVC insulated cable.
- Circuit wiring: shall be in separate conduit direct from distribution board to the switch board with 3x2.5mm² single core PVC insulated cable

Installation of wires: The conduit wiring shall be started only after the conduit system is completely installed and all out let boxes, junction boxes, distribution boards are fixed in position. All installation material such as solder, lugs, identification tags, pins, clips, straps, lubrication shall be provided without any additional cost. The wires shall be pulled in the conduit with care, and to facilitate pulling, the cable manufacturer's lubrication if needed shall be used for decreasing friction. Use of any kind of oil or soap will not be permitted. Where several wires are to occupy the same conduit, they shall be pulled together. The wires shall not be bent to a radius less than 12 times the overall diameter of the wire.

The wiring shall be continuous between terminations. The looping in system shall be followed through out. Any joint in the wire will not be allowed. The use of connectors will be allowed only at locations where looping in is rendered difficult. The consent of the Engineer will be required in writing for using connectors. The connectors shall be of porcelain body, having sunken screw terminals and terminal strips. The connector shall be wrapped with PVC insulating tape after its installation and enclosed in suitable box.

Terminal lugs, sockets, thimbles, insulation sheet required for terminating wire shall be provided by the Contractor. The wires inside switch board or control boards shall be securely fanned out in a neat arrangement and laced with wax cord. The wires of different phases shall be bunched and raced separately. The wires shall not be raced to conducting material unless a 1.5 mm thick plate of insulating materials is provided between the wires and the conducting material.

The wiring scheme for lighting in various open areas of the expansion project shall be as per drawings.

7.0 PVC CONDUIT / G.I. PIPE

For concealed wiring of lights and general purpose, PVC conduit of 20mm dia or as stated in BOQ or as approved by the Engineer shall be used. PVC conduit to be supplied by the Contractor shall be in standard manufactured lengths and tested according to BSS. The minimum size of conduit shall be 20 mm dia unless otherwise size is specified. Tests certificates of the manufacturer according to BSS shall be produce whenever required. For Hazardous area exposed wiring shall be in G.I pipe of minimum 20mm dia .

7.1 PVC CONDUIT ACCESSORIES

The Contractor shall provide all conduit accessories such as bushings, elbows, couplings, bends, inspection box, junction box, pull box, solid plugs as required for a complete conduit installation and they shall be of quality equal to that for PVC conduits.

Junction boxes; shall be of sizes as required to accommodate the number of conductors or conduits necessary. The junction boxes shall be of PVC. Outlet boxes for light and fan points on ceiling / wall / column shall be large enough to accommodate the necessary number of wires. The actual sizes of conduit shall be determined by the Contractor with the Engineer's approval, keeping in view the requirement, ease of operation for installation and maintenance.

Ceiling rose: The ceiling roses shall be mounted on the conduit junction boxes so as to finish flush with the surface of ceiling. The ceiling rose shall be fixed by means of flat head galvanized screws. If due to any reason the conduit junction box finishes well inside the soffit of slab, steel adopter rings shall be installed to facilitate flush installation of the ceiling rose as mentioned earlier. Such adopter rings shall be supplied without any additional cost. Where the Ceiling Rose indicated in the drawings shall be surface mounted.

All such outlet boxes shall be provided with one-piece cover plate, suitable for the device installed and blank for the junction boxes. The cover plate shall be so fixed that after finished work, its surface shall be in level with that of the wall or ceiling. In general sweep bends shall be provided in conduit using approved type of bending tools.

Installation of PVC Conduit: The Conduits shall be surface mounted or concealed in RCC slabs, beams, columns, walls, floors, or masonry as required. Conduits concealed in RCC must be installed before concrete pouring, with a minimum 12 mm concrete cover, and securely tied above the bottom reinforcement to prevent displacement. Chasing in RCC after concrete pouring is strictly prohibited.

For masonry or post-pour concrete work, chases shall be carefully cut to required depth only, conduits fixed firmly, covered with at least 25 mm concrete, and reinforced with steel wire mesh before plastering. All chasing and cutting must be coordinated with civil works and approved by the client prior to execution.

Conduit terminations must be coordinated with equipment locations. Open conduit ends shall be plugged to prevent entry of foreign materials, and boxes protected from concrete ingress. Bushes shall

be provided at terminations for cable safety. Expansion fittings must be installed where conduits cross structural expansion joints.

The conduit system shall be completed and tested for continuity and obstructions before wiring installation. Pull boxes shall be installed as required to limit cable pulling lengths, with inspection box lengths not less than four times the cable manufacturer's recommended bending radius.

8. DISTRIBUTION BOARD (DB)

Supply, installation, testing, and commissioning of internal distribution board complete with MCBs/MCCBs, neutral link, earth bar, busbars, and all internal wiring. The distribution board shall be wall mounted, the wall mounting type distribution board shall be fixed with their enclosure 16 SWG sheet steel box recessed in the wall or flushed with the surface of wall. Where the thickness of wall does not allow recessed mounting the distribution boards may be fixed semi-recessed in the wall. .

Installation and wiring of Internal Distribution board: The distribution board shall be properly mounted (surface or flush as indicated), aligned, and securely fixed. Incoming and outgoing circuits shall be neatly dressed, ferruled, and terminated with proper cable lugs. The distribution board shall be effectively earthed, and all wiring shall be carried out as per approved drawings, relevant standards, and project specifications

The wiring inside the distribution board shall be neatly arranged and it shall normally run on the sides of the board fixed by means of insulated clamps, PVC Non adhesive tape can be used for binding the wire. All connecting lugs, terminals shall be provided and fixed.

The circuits on the distribution boards shall be evenly divided on the three phases and spares, if any, shall be left out evenly on each phase as far as practicable.

The body of each Distribution Board shall be earthed with external earth terminal. The Earthing conductor size of each DB shown on the drawings flexible copper braid shall be provided for door earthing.

SECTION- 03

INTERIOR LIGHTING

1.0 GENERAL

- 1.1 The lighting fixtures shall be as specified in the lighting fixtures schedule. The determination of quality is based on construction material, shape, finish, operation etc. The Contractor shall submit sample of each lighting fixture specified for the approval of the architect / consultant / owner.
- 1.2 The description of light fixtures is given in the bill of quantities, and stated on the lighting fixtures schedule drawing, and all relevant material is described in this Section.

2.0 STANDARDS AND CODES

- 2.1 The latest editions of the following standards/codes shall be applicable to the material specified within the scope of this section:

a) IEC 62031	LED use in Luminaries
b) IEC 62471	Photo-biological Safety
c) IEC 61347-1& 2	LED drivers
d) IEC 62384	Independent driver Performance
e) IESNA LM 80:2008	Lumen Maintenance of LED light source
f) IEC 60529	Ingress Protection
g) IEC 60081	Double Capped Fluorescent Lamp
h) IEC 61347-1	Lamp Control Gear
i) ANSI C78	Lamps

3.0 SUBMITALLS

- 3.1 Contractor shall submit the following documents for approval to THE CONSULTANT:
- a) Manufacturer's data and installation instructions, Include technical descriptions, dimensions, finishes, and accessories.
 - b) Sample of each and every light fixture.
 - c) Manufacturer's catalogue and certificated photometric data.

4.0 LUMINAIRE

- 4.1 Lighting equipment and lighting fixtures shall be as called for on plans by designated symbols and type. Said equipment shall embody the highest standards of electrical and mechanical design with maximum efficiency obtainable and all shall be subject to the approval of the Consultant.

- 4.2 The luminaire consists of the luminaire body, heat sinks or shading devices internal optical devices, LED components, control gear and any axillary LMS components contained within or fixed to the luminaire body.
- 4.3 Watt and voltage (220V/50 Hz +/- 5%) rating, shape, size, housing, reflector, material and type of Lighting Luminaires shall be as shown on the Design Drawings/Documents.
- 4.4 Lamps used for indoor installations shall be LED Luminaires, Fluorescent or CFL lamps. All lamps shall conform to relevant standards in the section.
- 4.5 The LED lamp / light fixture shall comply and confirm the following specification:
- a) Luminous Efficacy : > 100-110 lumens/Watt
 - b) CRI : > 90
 - c) Colour Temperature : 4000K-6000K (as per BOQ & drawings)
 - d) UGR : Within the prescribed limits.
 - e) Useful Life : Depreciation to 90% of initial Lumen Output
 - f) Warranty : 2 years or above
- 4.6 High Pressure Sodium Vapor Lamp shall be used in areas where color rendering effect is not important.
- 4.7 High Pressure Mercury Vapor or Metal Halide Lamp shall be used in areas where superior color rendering effect is important.
- 4.8 The lamp diffuser shall be made of one-piece virgin acrylic, clear acrylic, or polycarbonate plastic or as specified on Design Drawings/Documents, and shall have the following characteristics:
- a) Inner surface of the diffuser shall be diffusing type while outer surface shall be smooth.
 - b) No apparent yellowing after 500 hours exposure to fluorescent lamp source under conditions similar to those existing in the lighting fixture.
 - c) It shall be resistant to shrinking, warping, crazing, cracking, or discolouring, either in service or when stored in normal conditions in the manufacturer's standard shipping containers.
 - d) Surface brightness of the diffuser shall be controlled by the pigmentation of the diffuser surface.
- 4.9 Globes for various lamps shall be as follows:
- a) The minimum thickness of globe shall be 3.2 mm. Its surface shall be free from visible mould seam.
 - b) Reduction in globe strength shall not be more than 10% after 5 years of its use.
 - c) Maximum permissible haze shall be 2%. The globe shall transmit minimum 88% light.
- 4.10 The lenses shall be made of plastic or glasses with the following characteristics:

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- a) The plastic lenses shall be made of clear butyrate or polycarbonate.
- b) The glass lenses shall be made of 6.35 mm thick tempered or laminated glass or 3.18 mm thick double strength clear glass.
- 4.11 All hangers, cables, supports, channels, frames and brackets of all kinds for safely erecting this equipment in place, shall be furnished from the standard manufacturer's product range and shall be erected in place under this Section.
- 4.12 The light fixture shall be finished in standard colors unless otherwise stated on drawings or directed by the Consultant.
- 4.13 The types of fixtures with manufacturer's catalogue reference are 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 photometric curves to show that the fixture proposed are of the same type, construction and quality.
- 4.14 The body of the light fixtures shall be minimum 18 SWG sheet steel or die cast, properly de-rusted, degreased, finished in heat resistant paint, stove enameled. Appropriate size bushed wire entry holes, fixing holes, and earth terminal shall be provided.
- 4.15 Each lighting fixture shall have a manufacturer's label affixed to it and shall comply with the requirements of all authorities having jurisdiction.
- 4.16 The supply to lighting fittings mounted on or recessed into a false ceiling shall be affected by means of a ceiling rose on a conduit box within the false ceiling space with a three-core heat resisting flexible cable connection. When fixtures are surface mounted to the ceiling. Ceiling rose to be provided adjacent to the fitting. In plasterboard ceiling areas, ceiling rose to be installed and supported next to the luminaire with a back box to terminate the flexible conduit from the conduit box within slab at high level.
- 4.17 All prismatic controllers for fluorescent fittings shall be of the injection moulded acrylic type to obviate discoloration. Plastic diffusers will not be accepted.
- 4.18 The fixture shall be supplied with appropriate driver either fixed or detached and shall be selected according to the wattage/type as indicated on Design Drawings/ Documents.
- 4.19 Weatherproof light fixtures shall comprise of UV treated plastic body or aluminum body and gasketed clear glass cover secured to the body by means of wing nuts/screws to give a weatherproof and watertight fit. The gasket shall be weather resistance type.
- 4.20 The glass shade of the light fixtures shall be opal white or clear as furnished by the manufacturer with the light fixture unless specified and free from any air bubbles or voids. The shade may be spherical, cylindrical, flattened bottom or any other shape as specified in the drawings or BOQ.
- 4.21 **LED/LED Chip**
- a) The LEDs shall be from one of following reputed manufacturer, Samsung, Cree, Osram, LG, Bridgelux, Citizen, Nichia or Lumi LED.
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- b) The individual LEDs shall be wired such that a catastrophic loss or the failure of one LED will not result in the loss of the entire luminaire.
- c) Color Rendering Index, CRI ≥ 80 . (For special applications, the CRI must be > 90 ; specially surgery rooms).
- d) LM-80-2008 test report run by accredited NVLAP laboratory should be provided and should depicts lumen maintenance for continuous 6000hr of operation under 3 different ambient temperatures as per IESNA or CIE TC2-50.
- e) TM-21 report by accredited NVLAP Laboratory should be provided for the reported life time.
- f) The light source shall be high brightness white light emitting diodes (LEDs) with individual minimum efficacy of at least 100lm/W arranged modularly to provide the required lighting output. i.e lab test performed at $T=25^{\circ}\text{C}$.

4.22 **LED Driver**

- a) Data sheets of the driver including, manufacturer, driver efficiency, catalogue code, certifications and input watts shall be provided.
- b) Driver(s) shall be current driven. LED drivers shall be Constant Current type to have higher lifetime and prevent light level fluctuations Constant Voltage Drivers are not permitted. The only allowed Driver amperes rating (350ml A for low wattage and 530ml A for High wattage).
- c) Driver(s) shall be current regulated $\pm 5\%$ including temperature variation.
- d) Driver(s) Housing should be encapsulated with minimum IP-65. Supply Voltage should be 50 Hz, 120-240V (phase voltage) with dimming functionality if dimming luminaire is required.
- e) Driver(s) Ambient Temperature rating shall be from -25°C to 50°C .
- f) Driver(s) shall have an Active Power Factor, $\text{PF} \geq 0.95$.

5.0 **INSTALLATION**

- 5.1 Installation shall be in accordance with the (IEC) or relevant standards as specified above, manufacturer's instructions and as shown on the Design Drawings.
- 5.2 The mounting heights of light fixtures are indicated on the drawings, and positions of fixtures are according to the mentioned scale.
- 5.3 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 consultant. All fixtures shall be carefully aligned before fixing in position.
- 5.4 All surface mounted fixtures shall be installed by means of galvanized steel screws or bolts

depending on the type of fixture and as advised by the Consultant.

- 5.5 For suspended lighting fixtures, the mounting heights shall provide the clearances between the bottoms of the fixtures and the finished floors as shown on the Design Drawings.
- 5.6 Lighting luminaire supports shall be anchored to channels of the ceiling construction, to the structural slab or to structural members within a partition, or above a suspended ceiling.
- 5.7 Where the suspended ceiling system is supported at the 4 corners of the fixture opening, hardware devices shall clamp the fixture to the ceiling system structural members, or plaster frame at not less than 4 points in such a manner as to resist spreading of the support members and safely lock the fixture into the ceiling system.
- 5.8 Where the suspended ceiling system is not supported at the 4 corners of the fixture opening, hardware devices shall independently support the fixture from the building structure at 4 points.
- 5.9 Coordinate between the electrical and ceiling trades to ascertain approved lighting fixtures are furnished in the proper sizes and installed with the proper devices (hangers, clips, trim frames, flanges), to match the ceiling system being installed.
- 5.10 At completion of Project, re-lamp all fixtures which have failed/burnt-out lamps. Clean all lenses, diffusers and louvers which have accumulated dust or dirt during construction.

END OF SECTION

SECTION- 04

STRUCTURED CABLING

1.0 GENERAL

- 1.1 Work in this section includes supply, installation/laying, termination, testing, labeling, certification and commissioning of a high-quality Voice & Data Communication Cabling Works as per BOQ, drawings and technical specifications.
- 1.2 All components pertaining to structured cabling system shall be from a single manufacturer and mixing of components from different manufacturers shall not be accepted.
- 1.3 The contractor shall install complete end-to-end UTP Cat - 6 cabling system solution. The proposed solution of UTP Cat - 6 must be provided with a minimum of 25 years performance warranty.
- 1.4 Wherever the standards (EIA / TIA, Cenelec, ISO) are not ratified, the latest "Draft" shall be referred.

2.0 SUBMITALLS

- 2.1 Following documents shall be attached and send for approval to THE CONSULTANT as submittals:
- a) Manufacturer's data and installation instructions.
 - b) Shop drawings showing all layouts, connections of all devices.
 - c) Authorization certificate of the contractor as an agent to backup specified 25 years system performance warranty from manufacturer.
 - d) Certificates of authorized installers from manufacturer certifying that contractor's personnel have been trained & certified for system installation.

3.0 SYSTEM DESCRIPTION

- 3.1 The horizontal cable shall constitute of four (4) Twisted Pair CAT6(UTP), solid copper conductors AWG24. The cable shall be specified up to 350 MHz or better and should have the following values or better for Attenuation and NEXT:

Frequency (MHz)	Attenuation (dB)	NEXT (dB)
1	2.0	74.3
4	3.8	65.3
10	6.0	59.3
16	7.6	56.3
20	8.5	54.8
31.2	10.6	51.9
62.5	15.3	47.4

100	19.6	44.3
250	32.3	38.3

- 3.2 The horizontal cabling shall be star-wired and free of tap and bridges.
- 3.3 The maximum horizontal distance shall be 90 Mtr. between the outlet and the patch panel (excluding patch cords and line cords).
- 3.4 One cable shall strictly be used for one application; cable sharing will not be acceptable.
- 3.5 The horizontal cables proposed must be from the same manufacturer as the other components proposed for outlets and patch panels etc.
- 3.6 All pairs are color coded and shall have an impedance of 100 ohms, with a tolerance of +/-15 Ohms.
- 3.7 All UTP and fiber optic cables shall conform to ANSI/TIA/EIA-568-B Commercial Building Telecommunications Cabling Standard and ISO/IEC 11801 CLASS EDITION 2: 2002 CLASS E, AS/NZS 3080:2003 CLASS E(International) Generic Cabling for Customer Premises standard.
- 3.8 Horizontal pathways shall be installed or selected such that the minimum bend radius of horizontal cables is kept within manufacturer specifications both during and after installation.
- 3.9 Telecommunications pathways, spaces and metallic cables which run parallel with electric power or lighting shall be installed with a minimum clearance of 50 mm (2 in).
- 3.10 Each run of UTP cable between horizontal portions of the cross-connect in the telecommunication closet and the information outlet shall not contain splices.
- 3.11 In the telecommunications closet where cable trays or cable racks are used, the contractor shall provide appropriate means of cable management such as reusable color-coded cable managers (ties) to create a neat appearing and practical installation.
- 4.0 DATA/VOICE OUTLETS**
- 4.1 The telecom outlet/connector shall be based on widely used RJ45 interface and shall feature excellent transmission performance and mechanical strength.
- 4.2 The telecom outlet/connector shall have characteristics of UTP Cat 6 enhanced up to max. MHz and shall be from the same manufacturer of the structured cabling system.
- 4.3 The contact wires (connector) shall be coated with at least 50um of hard gold.
- 4.4 All Cat 6 RJ45 outlets should be mounted in 25mm x 50mm shutters, double gang faceplate.
- 4.5 All RJ45 outlets should be fitted with spring loaded sliding shutters to prevent

the ingress of dirt and dust.

5.0 PATCH CORDS/ LINE CORDS

- 5.1 The patch cords and line cords shall constitute of two modular RJ45 plugs assembled on twisted pair stranded cable.
- 5.2 The UTP stranded cable shall be constructed using AWG23 flexible cable.
- 5.3 The sum length of all patch cords & line cords for one outlet shall not exceed 10Mtr.
- 5.4 Under no circumstances shall locally assembled patch cords and line cords will be acceptable, all must be factory made.
- 5.5 All line and patch cords shall be Cat 6 rated and shall be of the same material of horizontal cables, the characteristic impedance of the pairs must be identical to that of the horizontal cables.
- 5.6 All cords shall be covered by the manufacturer's warranty and certification.
- 5.7 All cords shall be transferable to any channel without degrading channel or system performance and not be required to remain on the channel where tests were performed in order to maintain certification.

6.0 INSTALLATION

- 6.1 The vendor will accept complete responsibility for the design, installation, certification, and support of the cabling system. Vendor must show proof that he has been certified by the manufacturers on all of these issues.
- 6.2 The telecommunications technicians employed shall be fully trained and qualified by the manufacturer on the installation and testing of the equipment to be installed.
- 6.3 Evidence that the vendor is a current certified installer of the manufacturer must be provided in writing prior to commencing work on the structured cabling for the building.
- 6.4 The contractor/vendor shall not engage any sub-contractor to carry out the structured cabling work and shall show proof of a contractual relationship with the manufacturer, and shall pass the manufacturer's certification to purchaser.
- 6.5 The installation shall comply with the requirements of ISO-11801 Class E as appropriate. The structured cabling system (cables, RJ45 outlets, panels etc) shall be labeled in accordance with EIA / TIA-606.
- 6.6 All UTP cables wired to the telecommunications outlet/connector shall have 4-pairs terminated in eight-position, non-keyed modular outlets in the work area. All pairs shall be terminated.
- 6.7 In spaces with UTP cable termination's, the maximum bend radius for 4-pair cable shall not exceed four times the outside diameter of the cable and ten times for multi-pair cable. This shall be done unless this violates manufacturer

specifications.

- 6.8 During the actual installation, bend radius on 4-pair cable shall not exceed eight times the outside diameter of the cable and ten times for multi-pair cable. This shall be done unless this violates manufacturer specifications.
- 6.9 Hook and loop fastener Wraps should be used in the closet where reconfiguration of cables and termination's may be frequent.

7.0 TESTING

- 7.1 The contractor shall test and demonstrate on site, to the satisfaction of the engineer, that the wiring is in full compliance with specific requirements of a Class - E installation (Max. MHz). All the tests shall be carried out in accordance with TIA/EIA standard.
- 7.2 The contractor shall provide test results (both hard copy and soft copy) for every data and every voice outlet using Fluke.

8.0 WARRANTY

- 8.1 At least 25 years Systems Warranty for Structured Cabling System shall be provided for an end-to-end Channel or Permanent Link Warranty which covers applications and components on all passive telecommunications equipment and cable.
- 8.2 The manufacturer of passive telecommunications equipment used in a manner not associated with the Systems Warranty must have a minimum 20-years Component Warranty on all its product. The Products Warranty covers the components against defects in material or workmanship under normal and proper use.
- 8.3 Applications supported include those approved by the Institute of Electronic and Electrical Engineers (IEEE), the Asynchronous Transfer Mode (ATM), the American National Standards Institute (ANSI) or the International Standards Organization (ISO) as of the date of registration. This would include but not limited to IEEE Std 802.3u-1995 100Base-T or IEEE Std 802.12-1995, Demand Priority or ATM Forum AF-PHY-0015.000 155 Mb/s over twisted-pair. Additional applications that are covered by this warranty include those under development on Gigabit Ethernet (IEEE 802.3z) and 622 Mb/s ATM that specify compatibility with the type of cabling installed.

END OF SECTION

SECTION- 05

FIRE DETECTION & ALARMING SYSTEM

1.0 GENERAL

- 1.1 The work under this section consists of supplying, installing, and commissioning of all material and services of the complete Fire alarm system with detection devices as specified herein and/or shown on Tender Drawings and stated in the Bill of Quantities.
- 1.2 The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at site with other services for exact location, mounting and position of the fire detection devices.

2.0 STANDARDS AND CODES

- 2.1 The following Codes and Standards to the extent specified herein, form a part of this specification. When an edition date is not indicated for a Code or Standard the latest edition enforce at the time of proposal submitted shall apply:
- a) BS5839 Fire Detection and Alarm System for Building
 - b) NFPA 72 National Fire Alarm and Signaling Code
 - c) BS EN64 Fire Alarm Detection System

3.0 SUBMITALLS

- 3.1 The contractor shall submit the following drawings and documents related with fire alarm system for consultant approval:
- a) Original catalogues for various proposed components.
 - b) Shop drawing of the layout with coordination with other services.
 - c) Schedule of Accessories and Fittings.
 - d) Test Certificates.

4.0 SYSTEM DESCRIPTION

- 4.1 The system shall include Intelligent Addressable main control panel, remote panel, addressable smoke sensors, heat sensors, line powered isolators alarm indicating appliances, interface with radio paging system, wiring, termination, electrical boxes, and all other necessary material for a complete operating system.
- 4.2 The contractor shall coordinate with the manufacturers/suppliers of the following systems in order to interface the fire alarm system to these systems:
- a) HVAC System
 - b) Fire Fighting System
 - c) Elevator Control System
 - d) Lighting Control System
 - e) Public Address System
 - f) Access Control System
 - g) Building Management System (BMS)

- 4.3 The fire alarm system shall allow for loading and editing instructions and operating sequences as necessary. The system shall be capable of storing, and downloading while the system is in operation, a second set of operating software resident in the control panels as backup in case primary operating software is corrupted.
- 4.4 The system shall be capable of on-site programming to accommodate system expansion and facilitate changes in operation.
- 4.5 All software operation shall be stored in a non-volatile programmable memory within the fire alarm control unit. Loss of primary and secondary power shall not erase the instructions stored in memory.
- 4.6 Resident software shall allow for full configuration of initiating circuits so that additional hardware shall not be necessary to accommodate changes in, for instance, sensing of normally open contact devices to sensing of normally closed contact devices or from sensing of normally open contact devices to sensing a combination of current limited and non-current limited devices on the same circuit.
- 4.7 The system shall have the capability of recalling alarms and trouble conditions in chronological order for the purpose of creating an event history of 600 events.
- 4.8 The system shall incorporate single channel two-way voice communication and tone generating capabilities.
- 4.9 The control panel voice command center shall be equipped with master telephone for two way voice communication with remote phones. Fire fighter's phone jacks shall be provided at remote locations as shown in the drawings.
- 4.10 8 Nos. (or as approved by the Consultant) pluggable phone shall be provided in the voice command center in BMS/security room.
- 4.11 The phone shall be ruggedly constructed of a thermal ABS material like Red Cyclocac , type T .A five foot coiled line cord and jack shall be attached to each phone.
- 4.12 Alarm indicating application shall operate selectively by building / floors as called for in the sequence of operation. Any subsequent zone alarm after silencing of initial condition shall reactivate all the alarm indicating application.
- 4.13 The activation of any system smoke detector shall initiate an alarm verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If within one minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm as described in the sequence of operation. If no second alarm occurs within one minute the system shall resume normal operation.
- 4.14 Other activated initiating devices shall be processed immediately. The Alarm verification operation shall be selectable by zone.
- 4.15 A manual evacuation switch shall be provided to operate the alarm indicating appliances without causing other control circuits to be activated. However, should a true alarm occur, all alarm

functions service conditions including the time of each occurrence.

- 4.16 The system shall have a single key that will allow the operator to display all alarm, troubles, and supervisory service conditions including the time of each occurrence.
- 4.17 The system shall have provisions for disabling and enabling all circuits individually for maintenance or testing purposes.
- 4.18 The panels shall be capable of networking up to 99 more nodes as nodes as and when required without modification of hardware except adding network cards.
- 4.19 All panels and peripheral devices shall be the standard of single manufacture of international repute having at least 10 years' experience in the field.

5.0 SEQUENCE OF OPERATION

- 5.1 Upon actuation of any manual station, or automatic detector or sprinkler flow switch, or air conditioning and ventilation duct return and exhaust air smoke detector. The system is to operate as follows.
- 5.2 On the Main Panel, the local panels and the annunciator panels the green normal LED is to extinguish and the red alarm LED is to light. An audible single is to sound.
- 5.3 Visually indicate on the LCD control panel label of the addressable device or circuit of alarm initiation.
- 5.4 The first line is to display the user specification message indicating the floor and zone that initiated the alarm. The second line of the LCD is to indicating real time, number of messages waiting, type of alarm, zone of alarm and time the alarm occurred.
- 5.5 Red LED corresponding to the zone in alarm in the main panel shall also be lit. The Graphic Command Center displays the plan of the zone in alarm with prompts for further action.
- 5.6 The alarm indicators on the FACP and repeater panel to continue to flash until the alarm is acknowledged. If a subsequent alarm is received after acknowledgment, the alarm is to sound again.
- 5.7 The operator is to acknowledge the alarm by pressing a dedicated button and the buzzer is to silence provided that isn't an additional alarm the operator is to acknowledge all pending alarms before the buzzer is to silence.
- 5.8 Sound evacuation alarm on floor of incidence the floor above and below or as per consultant approval. The alarm shall consist a "slow whoop" alarm tone, for ten second followed by thirty second followed by thirty second of an automatic pre-recorded voice evacuation message in Urdu and English.
- 5.9 The message is to ask the tenants to evacuate the building. The message and tone shall repeat continuously (unless manually silenced) until the alarm initiating device is restored to normal and system reset.
- 5.10 A time delay feature is to be provided to sound a general evacuation alarm automatically throughout the building if the initiating alarm condition is not responded to within a predetermined time. Visual indication at the panels, corresponding to activated voice alarm circuits is to illuminate.

- 5.11 Sound 20 pulses per minute alarm tone in the remainder of the building for 15 seconds followed by thirty second pre-recorded alert message in Urdu and English. The message is to draw attention to the possibility of a fire condition that is being checked out.
- 5.12 Recall all passenger elevators to ground floor or as designated by the Local Fire Department. If the alarm originates from the ground floor, redirect the elevators to the other floors or as designated by the Local Fire Department.
- 5.13 A common pre-recorded message is to be sounded in all seized elevators. Lifts are then to held for the exclusive use of the fire fighter by use of a special key.
- 5.14 Transmit signal to radio paging system to display zone of alarm.
- 5.15 All emergency stair and exit doors will release.

5.0 INTELLIGENT ADDRESSABLE FIRE ALARM CONTROL PANEL

- 5.1 The Intelligent Addressable Fire Alarm Control panel (FACP) shall be 16-bit microprocessor and have the ability to indicate the exact location of the fire to enable fast response to any fire calls. It shall have flash ROM to provide comprehensive addressing facilities and fully programmable user display using relevant software. Internal facilities shall include:
 - a) A 3 Amp charger and two rechargeable 8Ahr backup batteries.
 - b) The principal function of the system shall be surveillance for up to 800 field sensors on 2 loops Modular design.
 - c) 80 Character or above LCD status display.
 - d) Operator commands and system interrogation via keypad.
 - e) Digital Signaling to detectors with parity error detection.
 - f) PC Programmable according to site specific requirement.
 - g) A watchdog facility to test microprocessor integrity.
 - h) Additional protection circuitry for immunity to transients and EMI.
 - i) The control panel shall be ether-net connectivity through RS232 port.
 - j) Mains supply shall be 230 VAC 50Hz.
 - k) The system shall operate on 24V DC.
 - l) It shall monitor continuously all devices via two wire loops (ring circuits) that carries both power and data to and from devices and control panel allowing early warning of any fault occurrence.
 - m) The FACP shall utilize the addressable Smoke Detectors, Heat Detectors, Manual Call Points, Sounders, Relay and their communication shall be by means of pulse position modulation from the control unit.

- n) The protocol shall enable other devices such as line powered sounders, beacons and other input/output devices to be added to the line.
- o) A minimum of 127 or above devices may be connected to each loop.
- p) The control panel shall include an integral buzzer.
- q) The enclosure shall be fabricated from 14 SWG mild steel sheets, anti-rust treated and shall be finished in two toned greys to approval.'
- r) The door shall be hinged on the left-hand side and have a window to house the Perspex facia which shall accommodate the display and control.
- s) Access to interiors shall be via a key operated lock situated on the front.
- t) Line isolators are to be provided after every 15 devices in the loop.
- u) Control modules for auto shutdown of HVAC & other equipment.
- v) Interfacing with other systems like Emergency Evacuation System.

7.0 ADDRESSABLE MANUAL CALL POINT

- 7.1 Addressable Manual Call Point shall be of rugged ABS plastic construction designed for recess, semi-recess or surface mounting on a standard socket outlet box. It shall incorporate all the necessary circuitry to relay its unique identification and position to the control panel.
- 7.2 The break glass design shall be with a frangible element. The frangible element shall consist of a glass blank with a thin plastic film laminated to its surface, avoiding injury to the thumb and confining the glass pieces within the call point, when operated.
- 7.3 A single key shall be used for opening, testing and resetting of call point. A20% spare quantity of glass pieces is to be provided at no extra cost.

8.0 ADDRESSABLE SOUNDER

- 8.1 The addressable electronic sounder shall provide high efficiency tones and high outputs. It shall be set to provide up to 5 different tones.
- 8.2 It shall be designed to operate on very low current rating and shall operate continuously for 02 hours. Operating voltage shall be 9 – 28 Volts.
- 8.3 It shall be made of ABS Plastic case in Red or While Color. It shall be small and compact in design and weight.
- 8.4 The output shall be 100 dB at 1 meter.

9.0 ADDRESSABLE SMOKE DETECTOR

- 9.1 Smoke Detector shall be housed in off white self-extinguishing Plastic.

- 9.2 The base unit shall contain an address circuit, and also a pulse generator to provide coded signals representing the analogue voltage from the sensor. The address for each base unit shall be set to a number from 1 to 100 by an 8 pole switch visible through a hole in the base unit case.
- 9.3 The unique address should not have to be changed, and shall remain in position with the fixed base unit. The sensors shall be removed or replaced without resetting the coding switch, preventing accidental location numbering of replaced units.
- 9.4 It shall have Red LED which flashes periodically in the quiescent mode and flashes continuously in Fire, Alert or Fault mode.
- 9.5 Smoke Detectors shall be optical type.
- 9.6 Operating voltage shall be 10V to 30V DC.

10.0 ADDRESSABLE HEAT DETECTOR

- 10.1 The Addressable Heat Detector shall be constructed of self-Extinguishing plastic and protected against moisture and corrosion.
- 10.2 The base unit shall contain an address circuit, and also a pulse generator to provide coded signals representing the analogue voltage from the sensor. The address for each base unit shall be set to a number from 1 to 100 by an 8 pole switch visible through a hole in the base unit case.
- 10.3 The unique address should not have to be changed, and shall remain in position with the fixed base unit. The sensors shall be removed or replaced without resetting the coding switch, preventing accidental location numbering of replaced units.
- 10.4 It shall have Red LED which flashes periodically in the quiescent mode and flashes continuously in Fire, Alert or Fault mode.
- 10.5 It shall have a sensing unit to detect a change in temperature and incorporate an electronic control circuit.
- 10.6 When the ambient temperature changes by a predetermined amount, the sensing unit shall activate and initiate the integral LED. It shall operate on 55 degree C. Operating voltage shall be 10V to 30V DC.

10.7 FIRE MAN'S PHONE JACK

- 10.8 Remote phone jack station shall be recessed to the wall on a single gang box for use with portable phones.
- 10.9 Face plate shall be engraved "Fire Emergency Phone" The unit shall have a call LED indicator.
- 10.10 5 set of fire telephone also should be provided for use.

11.0 TESTING & COMMISSIONING

- 11.1 The system shall be tested and commissioned by the manufacturer's representative and witnessed

by Client / Construction Manager / Consultant.

- 11.2 Inspection, testing and commissioning shall be carried out in accordance with a field testing inspection and commissioning specifications to be issued by the contractor. The specification shall be subject to approval by Construction Manager / Consultant / Client.
- 11.3 Certificates of tests shall be complied, for each section of the installation. A master set of these documents shall be kept as the original of the test dossier.

END OF SECTION

Section - 06

LV POWER CABLES

6.1 **6.1 General**

This item shall consist of supplying, laying, ,testing ,connecting and commissioning of all material and services of Low Voltage (LV) cables and wires and the accessories with or without conduits, according to the specifications, bill of quantities, drawings and/or as directed by the Engineer. The Cables shall be supplied from the approved Vendor, as specified in approved manufacture list.

The Contractor shall discuss the electrical layout with Engineer and coordinate at site with others for exact route, location and positions of electrical lines and equipment.

The works shall comply with requirements of relevant IEC and British Standards, the LV cables and wires with accessories shall also comply with the requirements of BOQ Item.

All cables shall be certified by the manufacturer as suitable for installation at Project site.

All works, equipment and materials shall comply with statutory and other regulations, Codes of Practice and Standards current at the date of Tender.

6.2 **Material**

All LV cables shall be 4-Core, Cu, PVC insulated, Armored. The cable shall be suitable for operation in a 400 / 220 Volts, 50 Hz. for three phase multiple neutral earthed distributed system. The Electrical cable should be suitable for direct burial, for installation in air or running in the ducts/conduits. The maximum Ambient Temperature shall be 50 °C. The cable shall be suitable for conductor operating temperature as follows:

Continuous Operation	70 °C
Short circuit (5 sec. Maximum duration).	160 °C

6.3 **Standards**

Particular reference shall be made to:

- BS 6004 / 6346 PVC insulated cables for lighting and Power.
- BS 6746 PVC insulation for electrical cables.
- BS 6360 Copper/Aluminum conductors
- BS 6500 Insulated flexible cords.
- BS 6746 Cable Current Carrying Capacity and Voltage Drop

6.4 **LV Cable Construction Requirements**

6.4.1 **General :**

The construction of the 4-core armored cable shall be as briefly described below:-

All multi core cables shall be provided with identifications color scheme in conformity with the BS Specifications as. Red, Yellow, Blue for Phases and black for neutral. The insulated earth continuity conductors shall be having Green or Yellow color.

The ends of each length of multicore armored or un-armored cables shall be properly marked for clockwise and anti clock-wise sequence of core colors.

The armored cables shall comprise of shaped stranded Aluminum conductor, PVC insulated taped bedding, galvanized steel wire armor and PVC over sheath. The laid up cores shall have PVC / Polypropylene fillers both at the center and the outer sides to give the cable round shape. The insulation resistances of the cables shall conform to the relevant British Standard and these specifications.

A single layer of galvanized steel wire shall be applied over the extruded PVC bedding. The direction of armor wire shall be left handed. A PVC sheath shall be applied over the armor wire.

All LV cables manufacturing shall conform to the relevant BS/IEC/KE Standard Specifications.

6.4.2 Cable Fabrication

All cables shall be free of material and manufacturing defects, which would prevent it from meeting the requirements of this Specification.

6.4.3 Marking on Cable

3.4.3.1 The jacket for all cables shall be marked by embossing at intervals not exceeding one meter with the following minimum information:

- a. The manufacturer's name
- b. Voltage designation
- c. Type of insulation,
- d. Conductor size and material
- e. Year of manufacture
- f. Cumulative length at every one meter with the highest length mark on the outer end of the cable.

3.4.3.2 All cables shall be marked with "Property of PSPC".

3.4.3.3 All marking/numbering shall be indelible, marking by matrix print shall not be acceptable.

6.5 Cable Tests

6.5.1 General:

- All cables shall be tested in accordance with the latest standards and as specified herein. Supplier shall provide all test results for review and acceptance by Engineer.
- The full range of Routine, Sample and Type tests specified in IEC 60502-1, clause 14, 15, 16 and 17 shall be carried out as applicable.
- Routine/or special tests shall be carried out in the supplier's factory.

6.5.2 Routine Tests:

Following routine tests shall be carried out on all finished cables:

3.5.2.1 Electrical Resistance of Conductors, resistance values shall be in accordance with IEC 60228

3.5.2.2 AC voltage test, cable shall be tested for 5 minutes at the following voltages:

- Phase to Ground = 3.5 kV for single core cable
- Phase to Phase = 6 kV for multi-core cable

6.5.3 Sample Tests:

6.5.3.1 Conductor Examination shall be in accordance with IEC 60228.

6.5.3.2 Dimensional Check shall be in accordance with IEC 60502-1, clauses listed below:

- For insulation, clause 4.2 and table 3
- For outer sheath, clause 12.3

6.5.3.3 Hot Set Test for XLPE insulation, as per IEC 60502, clause 15.10.

6.5.4 Type Tests :

Complete test (electrical and non electrical) shall be carried out as per the relevant IEC standards.

6.6 PACKING AND SHIPPING

In addition to the applicable items, packing and shipping of the cable shall conform to the following:

6.6.1 The cable ends shall be sealed with a waterproof, heat shrinkable plastic or elastomeric end cap with adhesive type sealing compound. Cable ends shall be properly secured to the reel.

6.6.2 The cable shall be delivered without splices, on standard sized returnable wooden reel of sturdy construction properly packed and lagged externally to prevent possible damage to the cable during transportation. Wood lagging or better material shall also be secured with steel straps to provide physical protection for the cables during transit and during customary storage and handling operations.

6.6.3 The minimum diameter of the drum of the shipping reel shall not be less than the minimum bending diameter of the cable.

6.6.4 Cables shall be supplied in lengths of 500 meters. The allowable tolerance on the specified length shall be $\pm 5\%$.

6.6.5 Reel Markings:

6.6.5.1 Cable reels/drums shall be marked in legible and indelible letters on aluminum plate 30 x 20 cm plate, giving the following particulars:

- a) Cable voltage and conductor material and size
- b) Type of cable
- c) Length and weight of cable on reel
- d) Gross weight
- e) Dimensions of reel
- f) Manufacturer's name and country of origin
- g) Site address and purchase order number

- h) Serial number of reels
- i) Stock number in bold numerals
- j) Direction of rolling of reel

6.6.5.2 All markings shall appear on both sides of the reel.

6.6.5.3 Cable reel identification shall include any additional information as required by the Client/Engineer and in accordance with shipping instructions.

6.7 GUARANTEE

The supplier shall guarantee the cable against all defects arising out of faulty design or workmanship, or of defective material for a period of two years from date of delivery.

6.8 SUBMITTALS

6.8.1 Submittals Required with Tender

- a) Technical Data and Catalogues shall be submitted by the supplier to facilitate evaluation of the offer.
- b) Submittals Required Following Award of Contract
- c) Details of Manufacturing and Test Programs.
- d) Factory Test Reports.
- e) All the above required submittals shall be in hard and soft copy.

6.9 Laying / Installation of LV Power Cables

All the cables shall be laid in the trenches according to the drawings provided by the Consultant and to the approval of the Engineer. In addition to the instructions for burial of cables in the ground, the following instructions will also be followed:-

- a) One end of the cable shall be terminated on respective switch board and the other end shall be terminated at the respective connection point as indicated in the drawings but both ends shall have approved tags for ease of identification.
- b) All cables shall terminate in suitable glands for securing the armour wires and incorporating a packing ring for exclusion of water and moisture. The cables will be secured at requisite spacing by means of cable cleats or hangers
- c) After laying the LV Cable 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. If cable is crossing the road extra protection of GI/uPVC pipe other than mentioned in underground cable laying detail shall be provided.
- d) Sufficient slack shall be left in cables for this purpose that cut lengths of cables shall allow about 3% more in the measured lengths between terminations.
- e) Cables shall be drawn into position or laid, using a sufficient number of rollers and suitable equipment, for negotiating corners to avoid excess bending or damage to the cable.
- f) 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.

- g) All cables shall be marked at least at each end, switch gear and equipment termination, where cable enter or leave underground cable trenches or channels, where cable rises from one level to another, at 30 m intervals with predetermined identification numbers, by means of proprietary non-deteriorating type, PVC, heat shrinkable, strap-on type or equivalent, for the identification of cable and circuit. These shall be indelibly marked with cable number and securely fixed to the cable. Where conductors are left to be terminated by another party or left to be connected later, they shall be identified. The earth continuity conductor shall be laid in the trench with the cables. When crossing the road, the cable must be drawn through pipes or ducting blocks, which should extend under the footpath.
- h) Low voltage cables shall be laid at a depth of not less than 750 mm or as shown on the drawings. Trenches shall be excavated as per the details shown on the drawings or as directed by the Engineer.
- i) The bottom of the trench shall be covered with clean river soft soil of minimum 100 mm thickness before laying the cables. After laying the cables they shall be covered with additional clean river sand free from stones or other objectionable material. The river sand shall be placed well punned over and around the cables to a level of 150 mm above the uppermost cable. Mechanical punnets shall not be used. Protective cable tiles (bricks) shall be carefully covered over each cable as per drawing.
- j) Cable route warning/marker tapes for use during installation shall be continuously installed 300 mm below the ground level. The Polyethylene tapes shall have a thickness not less than 0.5 mm gauge, shall be 300 mm wide and manufactured from high grade polyethylene pigmented in bright colours. The following message in English shall be continuously printed in a contrasting colour in characters not less than 40 mm high specially protected against deterioration and fading.

- **DANGER**
- **LOW VOLTAGE CABLES BELOW**

The tape shall be supplied in rolls of adequate length on stout reels suitably crated for shipment. Tapes shall be in yellow colour with black lettering.

- k) It is the responsibility of the Contractor to take actual measurements of cable length, required between two termination points or complete, as per drawings and site.
- l) All cables shall be installed in continuous length; joints will only be permitted where manufacture of the cable in one length is not feasible. Marker slabs shall be provided above buried joints.
- m) 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.
- n) Cable marker shall be placed on the finished ground level to identify the route of the cables on every 30 m straight run, bends and joints.
- o) The Contractor shall plan and take special care to prevent any damage to existing underground facilities such as underground piping, cables, foundations, etc. The Contractor shall notify the Engineer of any obstruction encountered and shall provide

protective support or removal of such obstructions as instructed by the Engineer. Excavation adjacent to existing facilities, such as foundations manholes, ducts, underground pipelines and paving shall be braced and / or shored properly to protect those facilities during excavation and construction or elsewhere as designated, they shall be drawn into underground pipe ducts;

Where cables.

- ❖ cross roads or other paved areas with vehicular access.
- ❖ cross unpaved areas regularly used by vehicles.
- ❖ Enter buildings.
- ❖ Pass through corrosive soils.

- p) For all type of equipment, close attention shall be paid to the cable gland and sealing arrangement. Cable entries as provided by the manufacturer shall not be modified in any manner.
- q) All mechanical cable glands shall be correctly matched to the cable concerned and shall be tightened to frame pressure tight seal between gland and bedding of the PVC insulated cable.

6.10 LV Cable Termination and Joints

The Cables shall be terminated in a safe, neat and approved manner at the associated equipment. 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.

The cable jointing shall be made using heat shrinkable splices and termination kits suitable for 4-core Aluminum conductor LV cables. The joints and terminations shall be installed indoor or outdoor and shall be subject to the maximum ambient temperature of 50°C and relative humidity of 100%.

The cable may be laid in dry soil or in saturated soil with high water table. The completed outdoor joints and terminations shall be capable of withstanding the effects of direct solar radiation at their installed locations. The temperature of the surfaces exposed to direct solar radiation shall be regarded as 75°C, plus the effect of any internal heating. The joints and terminations shall be suitable for installation in a supply system of the following characteristics:

Frequency..... 50 Hz.
Operating Voltage..... 220 Volts Single Phase + 10% or
400 Volts, 3-Phase + 10%.

The cable joints shall be supplied in complete kit form with all materials and components required to complete the installation. Compression type connector and lugs shall be included in the kits conforming to the provisions of the provided specifications. Components supplied with adhesive coating shall have means to prevent the coated surfaces from adhering to each other. The material shall conform to KE's latest specification.

6.11 Installation

The installation shall be made according to the manufacturer's instructions and to the approval by

the Engineer. The following instructions shall be observed in addition to those prescribed by the manufacturer while executing the installation.

A heat shrinkable tubing, coated internally with a hot melt adhesive shall be provided to positively seal the ferrule to the PVC insulation on either side of the cable (supplied with the kit).

Mechanical strength of the cable and electrical continuity of steel wire armour shall be reinstated at the joint by use of an impact resistant, galvanized steel armoured joint case which is quickly installed around the joint.

The joint wrapped by the armour case shall be protected from corrosion and sealed from the external environment by use of a thick wall, weather, corrosion, and impact resistant heat shrinkable electrically insulating tubing or wrap around sleeve which is internally coated with an adhesive sealant.

Armour shall be clamped to wire armour using worm drive armour clamps. Armour support rings shall be installed below wire armour to prevent biting of wire armour ends into core insulation.

SECTION - 07

LV SWITCH BOARDS AND PANEL

7.0 GENERAL

Supply and installation of low voltage Switchboards and Panel boards including MDB, SMDB, DB, MCC, Wall Mounted, Floor Standing etc. and related accessories.

This specification section covers the design and fabrication of low voltage switch gear including all items of equipment and materials necessary to complete the assembly and the information, documents and data required to be supplied by the supplier.

Any separate panels shall be as detailed hereafter. Separate panels shall comply with the requirements of this specification section.

7.1. STANDARDS AND CODES

7.2 The assemblies and the associated equipment shall conform to the requirements of the latest edition of the following standards and codes where applicable:

a)	IEC 61439	Low Voltage Switchgear and Control gear assemblies
b)	IEC 947-1, BS 60947-2	Circuit breakers
c)	IEC 60947-1, IEC 60947-3	Isolators/switch dis connectors
d)	IEC 60185	Current transformers
e)	IEC 60186	Voltage Transformers
f)	IEC 51, IEC 414	Measuring instruments
g)	IEC 60947-1, IEC 60947-4	Contactors
h)	IEC 60947-1, IEC 60947-4	Overload relays
i)	IEC 60947-1, IEC 60947-4	Indication lamps, Push buttons, Switches
j)	IEC 60947-1, IEC 60947-5	Control relays
k)	IEC 947-6-1	Automatic transfer switching
l)	IEC 60529	Degrees of Protection Provided by Enclosures
m)	IEEE 315	Graphic Symbols for Electrical and Electronic Diagram

7.3 SUBMITALLS

7.3.1 During the time of the contract and before substantial completion of the electrical installation, submit to the consultant three (3) copies of descriptive literature, technical data, maintenance recommendations (from the equipment manufacturer), catalogues etc.

7.3.2 All mains and sub-main panel boards shall undergo the following test before dispatching and a test certificate shall be forwarded for the same.

- a) Primary injection test for all circuit breakers and meters.
- b) Secondary test for all protective relays.
- c) Millivolt drop test
- d) Insulation test

e) Function test

7.3.3 All such tests shall be witnessed by the Engineer or it shall be carried out by an independent testing authority.

7.3.4 Submit the complete manufacturers installation instructions of all the products used.

7.3.5 The contractor shall furnish the following shop drawings and documents along this submittal for approval:

- a) Dimensioned drawing showing outline of the switch boards arrangement and position of important external features. These drawings shall show masses, crane lift necessary for unloading and size of lifting lugs or eyes.
- b) Single line diagram showing all auxiliary devices.
- c) Original catalogues for various proposed components.
- d) Drawings of nameplate and all termination arrangements.
- e) Drawing giving typical mechanical and electrical details of the voltage control apparatus.
- f) Details of cable terminations and fittings.
- g) Foundation plan, including foundation loading.
- h) Schematic and connection diagrams covering all equipment pertaining to the switch board.
- i) Approved test certificate / test report.
- j) Schedule of Accessories and Fittings
- k) Technical Manual giving installation, operation and maintenance instructions.

7.4 SWITCHBOARDS (Floor-Standing)

7.4.1 Construction

- a) The switch boards shall be of the free-standing cubicle multitier type incorporating 3 Phase, neutral and earth insulated tinned copper busbars, all necessary CTs, and the like as required.
- b) Each cubicle shall be equipped with thermostatically controlled heaters which shall be 'on' all the time and ventilation means wherever shown in the SLD.
- c) The switchboards shall be tested against short circuit as a minimum and comply with IEC 61439, Multi cubicle type FBA, Form 4b, Construction. (optional)
- d) The switchboards shall be rated 400V three phase and neutral 4 wire 50 Hz. with neutral solidly grounded. The equipment shall be suitable for operating on a system having a fault level of 50 KA rms symmetrical.
- e) The construction shall consist of a structural or formed steel frame carefully braced and welded into a rigid structure that shall maintain its alignment and not be damaged in shipment or erection, or by stresses resulting from short- circuits.
- f) The switch board shall have frame structure of 2.5 mm minimum thick formed steel channels with welded sub-frames bolted to longitudinal members and reinforced at

corners. Side, top and rear covers (Panels) shall have minimum thickness of 1.5 mm or code-gage steel, bolted to the switchboard structure.

- g) No cast iron or cast aluminum shall be used in any part of the assembly which is subjected to mechanical stress.
- h) The removable rear access panels shall be of the concealed hinged type, or screw-on type. The front shall be completely enclosed with hinged panels covering each breaker, metering or blank compartment.
- i) Adequate ventilating louvers shall be provided only in the hinged panels where required to limit the temperature rise of current-carrying-parts, including contacts, to values specified in IEEE standard rules for enclosed equipment.
- j) All openings shall be protected against entrance of falling dirt, water or other foreign matter. Filters are not required for indoor assemblies. Each switchboard shall be mounted on a 100 mm concrete pad and anchored to two 100 mm channel iron sills by tack welding or bolting.
- k) Each switch board shall have an engraved nameplate fixed by stainless steel screws. The nameplate shall indicate a facsimile of the switchboard bussing and switch device arrangement in English.
- l) All devices located within a switch board shall be provided with suitable nameplates to identify item and function.
- m) A space of 100mm shall be provided at the bottom of each panel. The panel shall be of uniform height of not more than 2200 mm.
- n) The switchgear shall be painted inside and out. Unpainted galvanized coating of internal metal work will not be acceptable.
- o) The cubicle shall be divided into modules with a minimum of 15% of empty modules for extension.
- p) All enclosure parts shall be thoroughly cleaned, degreased and given a phosphatizing treatment to inhibit rust and to prime the metal for the finish coating. A 5 micron (0.2 mil) thick electrostatic powder paint coat shall be applied to all surfaces. The paint type and process shall meet ISO 12944-5 for electrical equipment steel enclosures. All exterior enclosure covers and doors shall be painted IEC RAL 7035 unless specified.
- q) Front Accessible - Front Connected Switchboards:
 - i. Designed to be installed against the wall.
 - ii. All mechanical and electrical connection shall be made from the front.
 - iii. Multiple-section switchboards have backs lined up.
 - iv. Switchboards are enclosed on all sides except the bottom.
 - v. Load-side risers are not available.

- r) Rear Accessible - Front Connected Switchboards:

-
- i. Designed to be free-standing.
 - ii. Designed for rear accessibility.
 - iii. All main connections shall be made from the front.
 - iv. All normal maintenance in the main bus shall be performed from the rear.
 - v. All line and load connections for branch devices are made from the front.
 - vi. Main bus bar is located behind the branch devices and is available only from the rear.
- s) Rear Accessible - Rear Connected Switchboards:
- i. Designed to be free-standing.
 - ii. Designed for rear accessibility

- iii. All main connections shall be made from the rear.
- iv. All normal maintenance in the main bus shall be performed from the rear.
- v. All line and load connections for branch devices are made from the rear.
- vi. Main bus bar is located behind the branch devices and is available only from the rear.

7.4.2 **Bus Bars**

- a) All bus bars shall conform to IEC 61439, 99.99% conductivity pure copper with tin plated contact surfaces. In no case shall dimensions be such that at rated load the current density in any copper bus bar exceeds 1,000 A per 645 mm² of cross-section.
- b) The bus bars shall be braced to withstand or exceed the short circuit rating of the switchboard as indicated on the Design Drawings for the service conditions as specified above.
- c) All buses shall be rigidly held by bus supports which have high and indefinitely long lasting dielectric qualities, are moisture resistant, non-carbonizing, non-tracking and have vertical creepage surface to prevent faults due to buildup of conductive dirt.
- d) The bus bars shall run continuously through all sections of switchboards, with provision made for extension at either end for future expansion.
- e) Bus bars shall be so mounted on the switchboard that no current carrying part (bus bar, nuts, bolts, connectors, switch parts, etc.), is less than 25 mm from grounded parts of the switchboard.
- f) Each phase of the main horizontal bus shall be insulated/isolated from each other and device load lugs (taping is not acceptable). Bus joints shall be insulated with removable caps to allow maintenance without removal of the barriers or tape.
- g) If neutral bus is required, the bus rating shall be equal to phase bus.
- h) A ground bus of minimum half the size of the phase bus bar, shall be provided running the full length of the switchboard, bolted to each vertical section.

7.4.3 **Wiring**

- a) Wiring shall meet relevant standards as specified above. All conductors shall be copper materials, except conductors that are internal to pre-manufactured devices.
- b) Control and secondary wiring shall be 2.5 mm² stranded copper conductors only.
- c) Each wire shall be identified with thermo-plastic, slip-on wire markers with permanently printed characters. Snap-on or adhesive type markers are prohibited.

7.4.4 **Terminal**

- a) Insulated, ring tongue or locking type fork, compressed (crimped) terminals shall be provided for all wiring terminations. Soldered terminals are not acceptable.
- b) All connection points between assembly devices and field wiring shall be
- c) made with terminal blocks. 20% spare terminal block points shall be provided.

7.4.5 Terminal blocks shall be one piece, phenolic, barrier type, rated 20 A, 400 V minimum with numbered marking strips and suitable for two terminations per

point. A maximum of 2 wires per point is permitted **Switching, Monitoring and Controlling Devices**

- a) Equipment ground-fault is recommended when the switchboard is applied on grounded-wye system.
- b) The Contractor shall submit valid test certificate for short circuit protection such as ASTA or as issued by any other independent testing Authority to the consultant for approval.
- c) ACBs shall be draw-out with ratings, breaking capacity etc. as mentioned elsewhere in this specification and contract drawings.
- d) Air circuit breakers shall be four-pole or three-pole type as indicated in the single line diagram for three phase and neutral systems. They shall be provided with "In Service/Out of Service/Test Point" positions and suitable locking devices shall be provided for the "Out of Service" and "Test Point" positions.
- e) The draw out contact shall be only between copper/copper alloy faces, which are silver-plated.
- f) Out-going MCCBs shall be Fixed type, operated by door interlocked rotary handles with ratings breaking capacity etc. as given elsewhere in this specification.
- g) The switchboard main circuit breaker shall be equipped with a ground fault protection system.
- h) The relay shall be solid state, 230 V or as shown on design drawings, and shall provide direct operation of the shunt trip device of the switchboard main circuit breaker. The relay shall be continuously adjustable from 5 to 60 A and shall have a time delay range of 0.30 to 1 second.
- i) The main incoming breaker shall be equipped with adjustable long time, short time and instantaneous trip elements. The breaker shall employ a spring- operated, stored-energy mechanism that assures high-speed closing of the breaker contacts, independent of the operating force.
- j) The branch circuit breakers shall be the same type as the main circuit breaker except for frame and over-current trip ratings. Those shall be as shown on the Design Drawings.
- k) The monitor panel shall be a flush mounted unit rated at 120 V or as indicated on contract drawing. The panel shall allow testing of the system with or without tripping the main circuit breaker. A pilot light shall be provided to indicate presence of control power.
- l) Voltmeters shall be panel mounted, heavy-duty type, suitable to operate on a potential transformer with phase selector switch to measure phase-

to-phase and phase-to-neutral volt. The accuracy class of voltmeter shall be Class 1. The volt meter shall be protected with a 2A circuit breaker.

- m) Three ammeters, suitable to operate on a current transformer for the measurement of line current shall be provided. The ammeter shall be provided with maximum demand indicator and shall have accuracy Class 1.
- n) Indicating lights shall be of the incandescent/LED type. Incandescent lamps shall have an integral transformer or series voltage-dropping resistor sized so that the applied voltage is 80% of the rated lamp voltage. All lamps shall be replaced from the front. Individual indicating lamps shall be of the push-to-test type.

7.4.6 **Installation Works**

- a) Each switchboard section shall be mounted on a 100 mm concrete pad and anchored to two 100 mm minimum channel iron sills, by tack welding or bolting. Sills shall be furnished by the Contractor to suit the switchboard and shall be leveled and grouted flush into the concrete pad by the Contractor.
- b) All shipping sections shall be installed on foundations and connected together as per the layout drawings and manufacturer's recommended practice.
- c) All bus bars of the shipping sections shall be connected together by stainless steel nut and bolts as per manufacturer's instructions. The torque applied on nuts and bolts shall be as recommended by manufacturer.
- d) All power and control wiring shall be completed as per the Design Drawings.
- e) In case of local assembly, the authorized / approved assembler shall strictly follow the guidelines and standards laid down by the manufacturer.
- f) Cable Glands shall be of the double sealed compression type with position armor bond suitable for XLPE and PVC insulated cables.

7.5.0 **PANEL BOARDS (Wall Mounted)**

7.5.1 **Construction**

- a) The panelboards comprising of incoming and outgoing circuits utilizing Molded Case Circuit Breakers (MCCB), Miniature Circuit Breakers (MCB) Residual Current Circuit Breaker (RCBO), Earth leakage Circuit breaker (ELCB) and Isolating Switches with appropriate SPD of type 1+2 for Main DBs and SPD Type 3 for critical DBs e.g. UPS, Data Centers etc.
- b) The Panelboard shall be dead front type Form 3b/2b with rigid self-supporting structures, with suitable structural galvanized steel reinforcement, stiffening and bracing. The Panelboard shall be tamperproof.
- c) The Panels shall be cleaned, de-greased and pre-treated with a phosphating process to

inhibit rust. The Panelboards shall then be primed with zinc and finished with 2 coats of IEC RAL 7035 or specified by Consultant light gray epoxy polyester powder paint.

- d) The front door of the Panelboard shall be provided with concealed hinges. All door locks shall be corrosion proof with retractable latches. All door locks shall be keyed for a single key.
- e) Bigger panel doors shall have minimum of 2 latches with 1 key or as per recommendation of manufacturer. All materials for door lock devices shall be rust proof.
- f) The Panelboard shall be suitable for top/bottom cable entry, or as shown on design drawings.
- g) Panelboards shall be equipped with a minimum of 20% spare breakers and a minimum of 20% spare pole spaces. The size of circuit breakers shall be representative of the connected breakers within the panelboards.
- h) All panelboard circuits shall be legibly identified as to purpose or use on a circuit directory located inside of panelboard door. The directory shall be covered by clear plastic or glass plate and metal frame.
- i) Each panel shall have a 25 mm wide laminated plastic nameplate that is attached on panel by aluminum rivets or stainless-steel screws.

7.5.2 **Bus Bar**

- a) The bus bars shall be tin-plated, except where joints are overlapping or mating surfaces that shall be plain copper with 99.9% conductivity as per relevant standards listed above.
- b) The bus bars shall be so located as to be free from physical damage and shall be held firmly in place.
- c) The arrangement of bus bars shall be such as to avoid overheating due to inductive effect.
- d) A neutral bus bar of the same rating as that of Phase busbar shall be provided.
- e) A ground bus shall be secured inside the panelboard. Panel board cabinets and Panel board frames shall be in physical contact with each other and shall be bonded to ground bus.

7.5.3 **Wiring**

- a) An insulated conductor used within the panelboard shall be listed, flame retardant, and shall be rated not less than the voltage applied to it, as well as other conductors or bus with which it may come in contact.
- b) The enclosure of the Panelboard shall have top and bottom wire bending spaces sized in accordance with IEC 61439, for the largest conductor entering or leaving the enclosure. The side wire bending space shall be in accordance with IEC 61439 and IEC 60364, for the largest conductor to be terminated in that space.

7.5.4 **Terminal**

- a) Each Panelboard shall have a minimum number of cable terminations equal to that of the number of individual circuits that the Panelboard has been designed to take. The termination shall be of the size sufficient to accept the largest size cable, which could reasonably be expected to be used on an outgoing circuit.
- b) The neutral and ground bus bar shall have minimum number of cable terminations equal to that of the number of individual circuits that the Panelboard has been designed to take.
- c) In panelboards, load terminals for field wiring (including grounded circuit conductor load terminals and connections to the ground bus for load equipment grounding conductor) shall be located so that it will not be necessary to reach across or beyond an un-insulated ungrounded line bus in order to make connections.
- d) All wire and cable connections to the main circuit bus system shall be terminated using 2-hole compression connectors.
- e) All wires and cables 95 mm² and larger shall be terminated using Compression connectors.

7.5.5 **Switching Components**

- a) All circuit breakers shall meet the requirement of standard listed above, and shall have trip rating as indicated on the Design Drawing.
- b) The breakers shall have quick-make and quick-break toggle mechanisms, inverse-time trip characteristics and shall be trip free on overload or short-circuit. Automatic release is to be secured by a bi-metallic thermal element releasing the mechanism latch.
- c) Molded Case Circuit Breaker (MCCB) shall be bolt-on type. Miniature Circuit Breaker (MCB) used on 230 V circuit shall be DIN Rail mounted type.
- d) The breaker shall have trip ratings as indicated on the Design Drawings or in the panel board schedules. Circuit Breakers shall have a minimum interrupting capacity of 14 kA symmetrical at 400 V. A magnetic armature shall also be provided to trip the breaker instantaneously for short circuit current above the overload range. The magnetic trip devices shall be adjusted at the factory to "low" trip setting ampere values.
- e) Circuit Breaker shall have standard ON/OFF escutcheon mark in All breaker handles and face plates shall indicate rated ampacity.
- f) The short circuit rating for the final outgoing MCBs shall be 6 KA.

- g) Panel board shall be equipped with a minimum of 10% spare breakers and a minimum of 10% spare pole spaces. The size of the circuit breaker shall be representative of the connected breakers within the panelboards.
- h) Panel board shall be provided with an isolator incomer with common ELCBs for group of lighting circuits and common ELCBs for group of power circuits for each section of MCBs for each power circuit as shown on schedules.
- i) Voltmeters shall be panel mounted, heavy-duty type, suitable to operate on a potential transformer with phase selector switch to measure phase-to-phase and phase-to-neutral volt. The accuracy class of voltmeter shall be Class 1. The volt meter shall be protected with a 2 A circuit breaker.
- j) Three ammeters, suitable to operate on a current transformer for the measurement of line current shall be provided. The Amper meter shall be provided with maximum demand indicator and shall have accuracy Class 1.
- k) Indicating lights shall be of the incandescent/LED type. Incandescent lamps shall have an integral transformer or series voltage-dropping resistor sized so that the applied voltage is 80% of the rated lamp voltage. All lamps shall be replaced from the front. Individual indicating lamps shall be of the push-to-test type.

7.5.6 **Installation Works**

- a) Installation of Panelboards shall be in accordance with relevant standards listed above, or as manufacturer's instructions.
- b) The Panelboard shall be installed in dedicated spaces and protected from damages.
- c) The Contractor shall mount Panel on wall, or flush in wall, or as shown on the Design Drawing.
- d) Surface mounted Panels shall be securely fastened to the wall, utilizing expansion bolts or mounting channels.
- e) The Panel shall be mounted square to the building lines; the mounting height of the center line of the top protective device shall not be greater than 1800 mm above finished floor.

7.6 **AUTOMATIC POWER FACTOR CORRECTION EQUIPMENT (PFI)**

7.6.1 **General**

- a) Provide automatic power factor correction equipment to improve the power factor at the main switchboards to a min. of 0.95. The system shall automatically switch predetermined steps of capacitor banks as programmed in the controller and be integrated in the main switchboards.
- b) Three phase capacitors elements to be mounted in IP42 enclosure with 2mm thick sheet steel with epoxy powder coating inside and outside RAL7032 with provision for dust proofing, Elements shall be replaceable without removal of enclosure from job site.

- c) Main terminal or contactor shall be provided as specified.
- d) Panel shall be floor standing type.
- e) Power Factor Correction enclosure for MCC shall be IP54.
- f) Current transformer of proper rating to be supplied and installed by the manufacturer in their equipment.
- g) Ventilation fan with thermostat operation is required. Overheating alarm shall be wired to B.M.S.
- h) Provide a detailed calculation to show the required capacity based on selected and approved equipment electrical loads.
- i) The design, construction and installation of the automatic power factor correction equipment shall meet the requirements of the latest editions of CSA C22.1, C22.2, No. 29 and No. 190.

7.6.2 **Capacitors**

- a) The three-phase capacitor cell shall be constructed of metallized polypropylene vacuum impregnated with NON-PCB oil, in one-piece extruded aluminum housing complete with integrated grounding/mounting stud. Capacitors to be self-healing type.
- b) Temperature range from -25⁰ C to +55⁰C as per IEC 831-1 & 2. Losses to be less than 0.2 W/kVAr.
- c) All rack mounted capacitor modules to be equipped with standard HRC Form 1 fuses, contactors approved for capacitor switching, current limiting reactors, distribution blocks, discharge resistors and capacitor elements.

- d) Capacitor bank to consist of CSA approved 15 kVAR capacitor elements or higher up to 50 kVAR to form the required rating for each step unless otherwise requested by Local Utility.

7.6.3 **Power Factor Controller**

- a) Controller, microprocessor based, to be self-contained and mounted in door of enclosure.
- b) The controller shall continually measure the actual phase angles, current amplitude and retain installed kVAR step size to automatically switch capacitors on or off as required. Other features shall include:
 - i. Automatic initialization of power factor controller (phase angle location)
 - ii. Automatic circular switching sequence (first step on is first step off)
 - iii. digital adjustable setting and display of target power factor for 0.85 lagging to 0.96 leading.
 - iv. Digital display of power factor.
 - v. Digital multiplier for switching time delay.
 - vi. Visual indication of capacitor steps energized.
 - vii. Visual indication of capacitive/inductive load.
 - viii. Manual operation (controller displays actual power factor).
 - ix. Zero voltage release.
- c) All rack mounted capacitor modules to be equipped with standard HRC Form 1 fuses, contactors approved for capacitor switching, current limiting reactors, distribution blocks, discharge resistors and capacitor elements.
- d) Capacitor bank to consist of CSA approved 15 kVAR capacitor elements or higher up to 50 kVAR to form the required rating for each step unless otherwise requested by Local Utility.

7.7 **TESTING AND COMMISSIONING**

- 7.7.1 Routine tests to standards shall be carried out. Evidence that type test have been carried out provided they are relatively to the configuration of the equipment offered, may be acceptable to THE CONSULTANT and shall be made available.
- 7.7.2 A full visual check and electrical functional test shall be carried out on all apparatus and every circuit. All wiring shall be inspected. It shall be verified that the FBA is fully in accord with the requisition. Circuit breakers shall be closed and tripped at their rated minimum and maximum trip and close supply voltage. Primary and secondary injection tests shall be done on protection relays and CT circuits and indicating and metering instruments. All labels shall be checked.

- 7.7.3 The test procedure shall be as follows:

- a) Visual inspection to verify degree of protection creepage and clearance distances.
- b) All conductors and cables are checked for proper routing and all devices for proper mounting.
- c) Check effectiveness of all mechanical devices, e.g. handles, locks, interlocks, operating devices, etc.
- d) Check panel conformity to drawing and Local Utility requirements.
- e) Megger test all main circuit through to final terminals. Insulation resistance shall exceed 10 megaohms. Record all measurements.
- f) Flash test all main circuit at 2.5 KV for one minute. Record leakage current.
- g) Repeat megger test to verify insulation resistance has not been affected by the dielectric test.
- h) Continuity tests of each circuit.
- i) Function test of all circuit breakers switches, contacts, etc. and every circuit to verify correct operation.
- j) Primary and secondary injection tests of all relays, CT's and indicating and metering instruments.

7.7.4 Prior to energizing the switchboards, perform the following checks on site:

- a) Operate the equipment through all design functions, including remote operation, actuation of alarm and indicating devices, mechanical and electrical tripping and closing and operation of the protective devices.
- b) Insulation resistance measurements on the buses, phase to phase and phase to ground, with all breakers in the fully connected position and contacts open.
- c) Control circuit insulation resistance to ground.
- d) Inspect all relays and protective devices, and verify settings in accordance with the manufacturer's instructions or the information in the Coordination study.
- e) Inspect current transformers and relays for correct polarity of connections and the installation of jumpers on unused current transformer circuits.
- f) Simulate the operations and check the logic of interlocks.
- g) Manually close and trip each breaker checking and adjusting the main contact alignment and wiring action in accordance with the manufacturer's instructions.
- h) Check the phasing on each side tie breaker, before closing.
- i) Test protective relay operation for incomer air circuit breakers.

7.7.5 **Routine Tests**

- a) Following routine tests are to be carried out by the switchgear assembler.

-
- b) Inspection of assembly including inspection of wiring and electrical operation
 - c) Dielectric test: Checking of protective measures and of the electrical continuity of the protective circuits.
 - d) Verification of insulation resistance.

END OF SECTION

SECTION - 08

STREET LIGHTING SYSTEM

8.0 GENERAL:

The work under this section consists of manufacturing, fabricating, 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.

The Street lighting work generally is to be in accordance with the requirements of the Specification including luminaries, columns, related power distribution and control, protective earthing and related works including column foundations, cable trenches and all material with accessories and services for the complete Lighting system as specified herein.

The Street Lighting system components consist of:

- a) Street Light Pole
- b) LED Luminaries
- c) LV Power Cable
- d) Terminal box
- e) Street light control panels (SLCP)
- f) Earthing

8.1 STANDARDS:

Luminaries generally are to comply with International standard i.e, BS/IEC and as per applicable. recommendations. Manufacturer is to verify compliance with these standards and the applicable local regulations and design standards.

8.2 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.

8.3 AMBIENT CONDITIONS:

Unless otherwise specified, equipment is to be designed and derated for continuous and trouble-free service at 50 °C ambient temperature and 100% relative humidity, with temperature reaching 70 °C in direct sunlight and with high content of ultra- violet rays. Equipment is to withstand full load operation whilst exposed to Sun.

8.4 EQUIPMENT DATA:

Submit complete data for approval including, but not limited to, the following :

- Detailed literature, in English, for each type of luminaire or fixture, lamp and control gear including manufacturer's name, catalogue number, rating, material specification, overall dimensions, operating characteristics and principles, and any modification to

a standard product if applicable

- Detailed specification and drawings for each column type including shape, base/mounting flanges, bolts, nuts etc, cross-sections, design criteria and calculations, brackets, finishes, provisions for cabling, cut- out or circuit-breaker etc.
- Photometric data for lighting calculations including polar curves, coefficients of utilization, efficiency and depreciation factors. Street lighting shall be carried out with Pole mounted LED light fixture shown on the drawings and indicated in the BOQ.

8.5 SHOP AND CONSTRUCTION DRAWINGS:

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.

8.6 SAMPLES:

The Contract shall Submit fully equipped sample of luminaire or other materials or components. The Contractor shall arrange two numbers of lighting Poles, prototype at site or at factory well before start the construction or fabrication of the Pole. .

8.7 CONSTRUCTION / FABRICATION OF STREET LIGHTING POLES / ARMS

The pole (vertical portion) along with base plate shall preferably be in one piece. The steel poles shall be galvanized by hot dip process both in and outside as per BS-729 (NFA 91121 and 91122 French), Octagonal steel poles complying with ASTM-A 501, BS 1840 / BS 4360 / BS 4848, NF EN ISO 1461 having height as specified in BOQ and drawings. Their cross sectional shapes shall be tapered Octagonal and conform to dimensions given in the drawings. Hot Dip Galvanizing (TS 914 - ISO 9001) shall be carried out after removing grease, burs and slag etc. so that zinc coating is adherent, dense, smooth, continuous and uniform. Minimum Zinc Coating 86 microns shall be required.

The steel used in the manufacture of poles shall be made by open hearth or electric furnace process.

The contractor shall ensure before placing of order that the firm has adequate facility for hot dip galvanizing process as per standard practice.

The steel for poles shall have the following requirements:

a) Tensile Strength

- Minimum 39.9 kg/mm²
- Maximum 56.3 kg/mm²

b) Yield Point

- Minimum 24.7 kg/mm²

c) Elongation

- for a 200 mm sample: 20% min.

The straight portion of the pole shall be truly vertical and no deviation more than 100 mm in the entire length shall be accepted.

Other tolerances shall be as follows:

Outside diameter	=	+1%
Wall thickness	=	+10%
Overall Length of pole	=	+0.5%
Weight	=	-0.3% +Not Limited

The pole and the bracket shall be so designed that when subjected to wind at a velocity of 160 km/hour on the full projected area of pole, bracket and the luminaire; a factor of safety of 3 on minimum tensile strength of the material shall be obtained. In addition, the temporary horizontal deflections at the luminaire position shall not exceed 1/40 of the length of the pole above ground at aforementioned wind velocity.

The Lighting Pole, single or double arm type shall be fabricated from 4 mm thick MS sheet. Poles shall be made in such a way that only one (1) sheet of steel plate is used to form a round conical/octagonal/tubular pole. Welding shall be carried out along one edge of the poles only. Poles seam welding shall comply with the latest edition of EN 1011-2 by automatic continuous welding process.

Poles shall have self-locking inspection door open-able with special key only. Pole inner compartment or pole inside dia. in front of inspection door shall be suitable to hold cable connection box.

The edges of the door opening on the pole shall be reinforced with a 10 mm thick M.S square bar to reinstate the strength of this location. The opening cover shall consist of waterproof hinged door with rubber gasket. The door shall be provided with heavy duty non-rusting lock .

The poles base compartment, designed to accommodate a loop-in services cutout for 4 cores PVC/SWA/PVC cable, the cable sizes given in drawing. An 8 mm stainless steel stud complete width nut and washers shall be provided in the base compartment of the pole for earthing purpose.

The material used for strapping the poles together during the delivery shall be of non-rust type. This is to prevent rust from appearing at the straps due to weather if stored for a long period.

Adequate arrangements shall be made to restrict bracket to rotate around the axis of pole at aforementioned wind velocity.

The J-bolt size shall be of 25 mm diameter and of galvanized Carbon steel. Each individual J-bolt

shall be complete with Galvanized washers and nuts.

8.8 INSPECTION AND TESTING OF STREET LIGHT POLES

8.8.1 General

The poles shall be tested and results recorded for each test by the manufacturer in the presence of an authorized representative of the owner or Engineer.

To verify conformance with the requirements of this specification and quality assurance of the Octagonal Poles Engineer's designated representative will conduct acceptance inspection and witness testing at the manufacturer's factory.

8.8.2 Inspection / routine Test requirements

The material, weight and dimensions of poles as specified shall be certified by the manufacturer. The Poles shall be inspected and in case being found below the limits of tolerance as aforementioned, shall be rejected.

Visual inspection shall include but not limited to: dimensional verification, checks for satisfactory workmanship, material quality, freedom from surface defects, even distribution and thickness of Galvanizing coating, and for compliance with the purchase order requirement, as applicable.

8.8.3 Loading Test

The poles shall be cantilevered horizontally and rigidly supported at base plate and loads applied at right angle to axis of the pole at some distance from top. The test items shall be as follows:

- Deflection test
- Permanent set test and Breaking Load Test

Sample comprising four poles shall be selected random out of each lot 50 and subjected to deflection test. One pole per 250 shall be tested for permanent set test and breaking load test. When the poles in Tender are limited in number, the manufacturer may avoid deflection, permanent set and breaking load test and supply results of tests already done for prototype testing on such poles or supply calculation based results.

8.8.4 Galvanizing

Weight, uniformity of coating and other requirements shall be strictly inspected in accordance with BS-729 or other relevant international standards.

8.8.5 Terminal Box

Each pole shall be provided with a waterproof and dust tight loop-in-service Terminal box accommodate in the Pole shaft .

The Terminal box shall comprise one 2 A MCB single arm poles and two 2 A MCBs for double arm poles (all MCBs shall be capable of operating at 55° C), a solid neutral link and earthing

terminal. It shall incorporate arrangements for looping "IN" and "OUT" for 4 core upto 70 mm² PVC/SWA/PVC cable. The earth terminals, nuts and washers shall be adequately sized to take the earth continuity conductor with tight connections.

Dimensional drawing and details of the Terminal box shall be submitted for approval of the Engineer.

8.9 INSTALLATION OF STREET LIGHTING POLES

8.9.1 Erection of Street Light Pole

The fixing of poles shall be carried out in accordance as per drawing and Specification or as directed by the Engineer.

The poles shall be erected in a true vertical position. The contractor shall be responsible until completion of the maintenance period for correcting the alignment of any pole/bracket from its original position except where it is due to vehicle impact.

Where lighting poles are to be installed in the vicinity of overhead power lines, the Contractor shall inform the Engineer and act as directed by him. Earth backfill around pole foundation, shall be done in 150 mm thick layers and shall be well rammed and compacted to provide full lateral support.

8.9.2 Foundation of Lights Pole :

The installation of poles shall be carried out on the concrete foundations, as per approved drawings. Foundations for lighting columns, poles, posts and pedestal shall be as per drawing having concrete strength of 3000 psi nominal mix concrete, with Sulphate resisting cement used where required by the Engineer. Forms of foundations shall be true to line and grade, and the exposed portions shall present a neat appearance. Conduit ends and anchored bolts shall be held in place with a template till concrete sets, Plumbing of the column/pole shall be accomplished with the leveling nuts before placing of mortar; shims, or similar devices, will not be allowed. The space between the base plate and foundation block shall be grouted with foam concrete as detailed so as the cable is not damaged. Pre-cast foundation shall be allowed and the foundation shall be cured for at least 14 days dried for 3 days and then the bituminous coating shall be done to the outer face of the concrete block which shall be buried in soil.

The installation work shall be carried out in accordance with the specifications as well as to the approval by the Engineer. The soil bearing capacity at the site shall be ascertained so that the foundations can be correctly designed.

8.9.3 Pole Internal wiring

- (a) An adequate length of PVC/PVC sheath cable, 3 core 2.5 Sq.mm rated at 450 / 750 Volts shall be provided for the connection between Terminal Box Circuit breaker and the Light Fixture. The cables shall be properly supported to prevent undue strain on the cable terminations. The cable color identification shall comply with the latest Standards

(b) The cables used shall be manufactured to the latest edition of IEC 60502-1.

(c) Internal wiring of luminaries shall be carried out with heat-resistant cables, and additional protective sleeves apply at critical points.

8.9.4 Cable Terminal Box

The cable terminal box shall be made of impact resistant, flame retardant thermoplastic material. All metal parts either stainless steel or galvanized copper alloy.

The cable **Terminal** boxes shall be IP 44 rating protection class suitable for 400 Volts minimum.

The Terminal boxes shall fit in with ease into the lighting column / pole. The connection boxes shall be in accordance to IEC and DIN-VDE standards.

- IEC-60439 (LV Switchgear)
- VDE 0660 – 505 (Switchgear and Control Gear)
- DIN 43628 (Fuse / Breaker Boxes for Cable Protection)

The cable Terminal box shall be in accordance to the wattage of the lamp.

The cable connection box shall constitute in the following:

1. Earth cable break-out and connection.
2. Miniature Circuit Breaker (MCB) DIN rails mounted. 1 or 3 Nos. where applicable.
3. Miniature Circuit Breaker rating shall be in accordance to the wattage of the lamp
4. Lamp cable connection area:

The cable connection box shall be suitable for the number of incoming / outgoing cable sizes as per design.

Pole shall have one number earth lug at inside the Termination box. The pole shall have overhang arms to hold light fittings / fixtures weight of 20 kg (aprox). The base plate to the main shaft is electrically welded at factory. Any damage to galvanization during transport shall be made good. No welding to any part of the pole shall be done after it is hot-dipped galvanized in and out with base plate pre-welded to the main shaft and inspection door.

For all types an earthing connection point may be provided inside the shaft near the door opening without reducing the space of electrical gear.

Data To Be Submitted

Before manufacturing, the contractor shall provide the following data:

- Manufactures
- Country of origin
- Type with manufacturer's catalogue and descriptive leaflet
- Details of construction with detailed specifications of material used for Column and holding down bolts

- Details and its welding procedure and material used in the welding.
- Calculation showing details of stresses under maximum wind loading and gusting
- Calculations and sizes for necessary concrete support bases
- Design calculation sheets for the poles from manufacture shall also be submitted by the Contractor to show that poles/foundations are safe for all specified stresses
- Shop drawings of the offered Pole.

8.10 PACKING AND SHIPMENT OF STREET LIGHTING POLE

Lighting Poles shall be handled / transported and erected in such a way so as to avoid any damage. Any damage to pole or galvanizing shall be made good to the satisfaction of the Engineer. The lighting Poles shall be stored clear of soil, ground water or other rust producing materials.

In addition to the packing and shipping requirements, the following shall be fulfilled:

- a) The Pole shall be stacked with spacers and blocks in order to avoid damages of zinc coating during the loading and transportation.
- b) All Octagonal steel poles in conformance with the requirements of this specification shall be supplied pre-assembled, i.e. top cap and bearing plates are pre-installed on the pole shaft. Supplying any loose part/component is not acceptable.
- c) Poles shall be delivered in bundles of 6 poles with the arrangement of 2 layers, with 3 poles per layer, and strapped at four (4) locations of equal distances with the use of high tensile, low-elongation steel straps size 31 mm x 0.8 mm (min.) and necessary wood separators, padding or cushion material underneath the steel straps.
- d) Wooden separators shall be provided between the horizontal and vertical layers of poles to avoid scratches and to facilitate slinging.
- e) Bundled poles shall be so arranged such that the earthing hardware are not disturbed during normal handling.
- f) Reasonable care shall be exercised in the handling and shipment of steel poles. Any expense incurred due to the careless handling and shipment of steel poles shall be considered as a legitimate back charge against the supplier.
- g) Extra care shall be taken during the transportation and storage to prevent the poles from damage.

8.11 STREET LIGHT FIXTURES

General:

The work under this section consist of manufacturing, fabricating, supplying, installing, testing and commissioning of all material with accessories and services for the complete LED fixtures as specified herein.

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.

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 cables. The street light operates in the stand alone mode.

Ambient Conditions:

Unless otherwise specified, equipment is to be designed and derated for continuous and trouble-free service at 50 °C ambient temperature and 100% relative humidity, with temperature reaching 70 °C in direct sunlight and with high content of ultra-violet rays. Equipment is to withstand full load operation whilst exposed to sun.

8.12 CONSTRUCTION OF STREET LIGHTING FIXTURE

8.12.1 Housing:

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 IP66. Both the driver and LED lamp compartments shall be designed to be easily accessible for maintenance

8.12.2 Optics :

- 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 130 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.

8.12.3 LED Driver/Electronic Control Gear for LED Modules :

The LED driver shall be designed to operate large array of high powered LEDs through current controlled output. The driver shall be suitable for 220V,+ 10%,-15%, 50 Hz, single phase mains AC supply. The LED driver shall have an efficiency of at least 85%.

The LED driver shall be manufactured Harvard, TCL, Philips, Lumotech, Bossloh Schwabe, Lightech.

8.12.4 LED

The LED Chip shall be Philips, Lumiled, Cree USA, Nichia Japan, or Osram Germany make.

The LEDs shall:

- Be designed for lumen maintenance of L70 or 70% at the end of useful life at ambient temperature of 50° 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.

8.12.5 Surge Protection

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 61347-2-7 and should be listed in Luminaries IEC 60598-2-3

8.12.6 IP Protection / Impact Resistance

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.

8.12.7 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 and to offer reinforced electrical insulation via dielectric layer. The metal core 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.

8.12.8 Photometric

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 required.

8.12.9 Future Compatibility

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.

8.13 **INSTALLATIONS OF LIGHT FIXTURE**

The mounting of the fixture shall be in axial orientation through suitable sized sidearm. The means for attaching the luminaries or external part to its support shall be appropriate to the weight of luminaire 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.

All Street lights to be energized through street light control panels (SLCP),. Approval of the Consultant shall be obtained before ordering and manufacturing the equipment.

All lighting shall be controlled automatically with the facility of manual control as well as specified and indicated in the drawings. Automatic controlled shall be installed comprising time switch, time relay, air breaker contactor etc.

8.14 **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.

8.15 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)
- IEC6247-1 (For the complete fixtures being offered as well as for the LED Chips)
- LM-79 (for the Luminaries being offered (Model/Wattage specific)
- LM-80 (for 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 (Environmentally 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
- Technical and descriptive data and drawings.

8.16 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 shall be required.
- LM-80 test report of LED used
- LM-82-12 approved method of measuring LPW @ 50°C (test report of the fixture type / wattage shall be required.
- Thermal management test report (UL 1598) of the fixture type/wattage shall be required.

- 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.

8.17 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.

8.18 PRE-SHIPMENT INSPECTION (WITNESSING OF FACTORY ACCEPTANCE TESTS)

In order to ensure the genuineness of the lighting fixtures, Factory Acceptance Tests (FAT) as stipulated in the relevant standards shall be witnessed by the personnel of the Employer and the Consultants. All costs in connection with witnessing of the factory tests by the Employer and the Engineer shall be borne by the contractor. These shall include the cost of air travel from Pakistan to place of inspection/testing and back, hotel accommodation/boarding/lodging (as per actual), inland transportation and daily allowance for inspection/testing to be conducted outside Pakistan.

8.19 Street Light LV Cables

The street light cables shall be 4 core 600/1000 Volt grade PVC / PVC cable. The size and Type

of cable shall be as per drawing.

The cable shall be as per BS / IEC latest Specifications. The cable shall be suitable for direct burial, or installation in ducts as shown on drawing. The cable shall be laid in the already excavated trenches as per drawing provided by the Consultant. The instructions of the manufacturers shall be followed for laying the cables in addition to general instructions of laying the underground cables. This shall carry approval of the Consultant / Engineer.

The LV cable specification shall be same as already specified in Section - "LV Power Cables".

8.20 Street Light Control Panel

8.20.1 Materials

The street light control panel shall comprise of the control device and A.C. contactor for correct and reliable opening and closing of the contacts. The control device shall be photoelectric. The equipment shall be installed within a weather proof, dust proof and moisture proof cabinet. It shall have a small transparent window for photoelectric cell. The MCB shall control a group of lights and MCCB shall be rated to their total current. It shall be lockable.

The SLCP enclosure shall be Vermin proof, for this purpose two metal sheets one fixed and other removable and sliding, with necessary provision of adjustable slots for cable entry shall be provided to seal off the bottom of the SLCP .

8.20.2 Moulded Case Circuit Breaker

A Triple Pole 500 Volts, 50 Hz. MCCB shall be used as incoming breaker for SLCP.

8.20.3 Miniature Circuit Breaker

Miniature Circuit Breakers shall be provided on each outgoing circuit for short circuit protection.

8.20.4 Timer Switch

Synchronous motor operated time switches shall be installed having 12/24 hours auxiliary sparing reserve operating on 220/250 volt, 50 Hz. with plug in type time switch and base incorporating one normally open and one normally closed contact of minimum 5-Amps size. An adjustable hand-set or solar dial shall be provided in the timing switch for setting of switching time.

8.20.5 Photoelectric Cell

The photoelectric cell and actuating relay shall have the following mentioned below; The photoelectric cell shall have the following ratings: -

▪ Operating Voltage range	210 to 250 volt AC
▪ Load Current Capacity	10 Amps.
▪ Light Levels. To turn ON	50 Lux

To turn OFF

200 Lux

8.20.6 Relay (Magnetic Contactor)

It shall be triple pole single throw and of electromagnetic type. Pole magnet shall be dimensionally stable. Performance shall be chatter free. Contacts shall be of long life at rated load. Some arrangements shall be provided with the armature to counter-act the effect of high inrush current.

The A.C. contactor for closing and opening of electrical street lighting circuits shall have the following features:

- (i) Maximum Ambient Temperature 50 °C and relevant humidity up to 100%.
- (ii) The rated operational voltage of the contactor shall be 400 volts A.C.
- (iii) The rated control supply voltage for operating the contactor shall be 220 volts A.C. single phase.
- (iv) The Contactor shall close satisfactorily with a control voltage between 85% and 70% of the rated voltage. The dropout voltage shall not be higher than 75% nor (with worn contacts) lower than 10% of the rated control supply voltage.
- (v) The rated thermal current which the contactor shall carry without exceeding the temperature limits specified in the relevant clause of the provided specifications shall be 60, 50 or 40 Amps.
- (vi) The rated operational current of the contactor shall be 60, 50 or 40 Amps.
- (vii) The rated frequency shall be 50 Hz.
- (viii) The Contactor shall be suitable for uninterrupted duty, that is to remain closed without interruption for periods of more than 8 hours.

The material and constructional features of the street lighting control devices and AC Contactor shall be as per latest Standard / Specification.

The control panel mechanical and electrical design shall be as per drawings provided herein and approved of the Consultant / Engineer.

8.20.7 Installation of the Lighting Control Panel :

Concrete Pad shall be constructed for the installation of Lighting Control Panel. The size of concrete pad given in drawing is tentative. The Contractor shall submit the foundation shop drawing after approval of SLCP shop drawing. The installation shall also carry approval by the Engineer.

Street Light Fixture Technical Data Sheet to filled by Contractor.

Sr. No.	Parameter	Details / Description
1	Luminaire Type / Model	
2	Manufacturer	
3	Country of Origin	
4	Warranty (Years)	
5	Certification Standards e.g., IEC, EN, UL	
6	Optical Specifications	
	▪ Power Rating (W)	
	▪ Luminous Flux (lm)	
	▪ Efficacy @ 3000K, lm/W	
	▪ Color Temperature (K)	
	▪ CRI	
	▪ SDCM	
	▪ Beam Angle (Degrees)	
	▪ Cover	
7	Electrical and Mechanical Specifications	
	▪ Power Rating (W)	
	▪ Power Factor (PF)	
	▪ Surge Protection e.g., 10 kV / 10 kA	
	▪ Fixture Dimensions (L × W × H)	
	▪ Housing Material	
	▪ Housing Finish / Coating	
	▪ Mounting Type	
	▪ Tilt / Orientation	
8	System Specifications	
	▪ Rated Voltage (V) / Frequency (Hz)	
	▪ Control	
	▪ Operating Temperature Range	
	▪ Storage Temperature Range	
	▪ Lumen life Time (hrs.)	
	▪ LED Chip Make/Model/Country of Origin	
	▪ Driver Type (Dimmable / Non-dimmable)	
	▪ Photocell / Sensor (Yes / No)	
	▪ Dimming / Control e.g., 0 - 10V, DALI	
	▪ Smart Connectivity (Yes / No)	
	▪ Safety Approval (EMC / RoHS / CB)	

SECTION - 09

IP BASED CCTV SYSTEM

9.0 General Requirement

The work under this section consists of supply, installation, testing & commissioning of IP CCTV Surveillance 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.

The entire IP surveillance system shall monitor entrances, exits and other selected public areas of the facilities at PSPC, N-1 Gate Area Karachi.

The Surveillance CCTV system work generally is to be in accordance with the requirements of the Specification. All cameras shall be true IP camera, 1080p or higher resolution, and Power over Ethernet (PoE). All outdoor cameras shall be rated IP 66 or higher. All outdoor items for cameras like junction boxes, power supply, media converter etc. shall be in water proof and dust proof housings. Surveillance system shall include centralized recording solution with Video Management Software and Network Video Recorder. Approximate camera locations are shown on the drawings. Contractor shall finalize locations based on optimal field of vision and coverage. All CCTV cameras shall have connectivity to Owner's PoE-powered dedicated local area network.

9.1 STANDARDS:

The Surveillance CCTV system are to comply with International standard and as per applicable recommendations. Manufacturer is to verify compliance with these standards and the applicable local regulations and design standards.

9.2 CCTV SYSTEM 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.
- Outdoor cameras shall be 4MP resolution, weather proof, with auto iris, varifocal lens, PoE and IR to provide better view in night conditions with IP65/66 environmental enclosure.
- PTZ cameras shall be full HD 1080P/720P resolution with varifocal lens, high SNR, wide dynamic range, IR LEDs with 100Meter Range, 20x Optical zoom and 16x digital zoom, and true day/night feature with weather proof enclosures and ONVIF compliant as per site requirement.
- Housing of cameras meant for outdoor use shall be of IP 66 or better rating with sunshield, fan and heater as per site requirement. These must be integrated by the camera manufacturer.
- System must provide built-in facility of watermarking or Digital certificate to ensure tamperproof recording so that these can be used as evidence at a later date, if so desired.
- All camera recordings shall have Camera ID & location/area of recording as well as date/time stamp. Camera ID, Location/Area of recording & date/time shall be programmable by the system administrator with User ID & Password.

- Facility of camera recording in real-time mode (30 FPS)/15/12.5/10 or lower FPS as well as in any desired combination must be available in the system.

- Facility of Camera recording in CIF, 2CIF, 4 CIF, D1 as well as in any combination i.e. any camera can be recorded in any quality – Selective or Group of cameras must be available in the system.
- System should have facility of additional camera installation beyond the originally planned capacity.
- In order to optimize the memory storage use, while recording, video shall be compressed using H.264 / MPEG-4 or better standard and streamed over the IP network.
- System shall be triplex i.e. it should provide facility of Viewing, Recording & Replay simultaneously.
- The offered system shall have facility to export the desired portion of clipping (from a desired date/time to another desired date/time) on CD or DVD or USB Storage. Viewing of this recording shall be possible on standard PC using standard software like windows media player etc.
- System shall have provision of WAN connectivity for remote monitoring.
- The software shall operate on open architecture for integration with perimeter safety, access control, systems based on open standards.
- Digital video surveillance control software should be capable to display and manage the entire surveillance system. It should be capable of supporting variety of devices such as cameras, video encoders, video decoders, PTZ controller, NVR etc.
- The software should have inbuilt facility to store configuration of cameras, encoders / decoders and other devices.
- The software should Support flexible 1/4/9/16 Windows Split screen display mode or scroll mode on the PC monitor or on preview monitor as per site requirement.
- The software should be able to control all cameras i.e. PTZ control, Iris control, auto / manual focus, and color balance of camera, Selection of presets, Video tour selection etc.
- The software is required to generate reports of stored device configuration. The control software is required to provide alarm and alarm log. The log shall be able to be achieved, printed and displayed using a device filter, a device group filter and/or a time window.
- The software should have user access authority configurable on per device or per device group basis. The user shall have the facility to request the access of any camera and can control the camera for a reservation period. Control of camera is released after the reservation period.
- The system shall provide User activity log (audit trail) with user id, time stamp, and action performed, etc.
- The administrator should be able to add, edit & delete users with rights. It shall be possible to view ability / rights of each user or the cameras which can be viewed & controlled as per the permission assigned by the administrator.
- The users should be on a hierarchical basis as assigned by the administrator. The higher priority person can take control of cameras, which are already being controlled by a lower priority user. There should be minimum 3 hierarchical levels of security for providing user level log in.

- It should have recording modes viz. continuous, manual, or programmed modes on date, time and camera-wise. All modes should be disabled and enabled using scheduled configuration. It should also be possible to search and replay the recorded images on date, time and camera-wise. It should provide onscreen controls for remote operation of PTZ cameras. It should have the facility for scheduled recording. Different recording speeds (fps) and resolution for each recording mode for each camera should be possible.
- It should provide programmable motion detection and recording, to be defined area wise. System must be able to support video motion detection algorithms to detect and track objects, Learn the scene, Adapt to a changing outdoor environment, Ignore environmental changes including rain, hail, wind, swaying trees and gradual light changes.
- The settings shall be individually configurable for each alarm and each camera prerecord duration. This shall allow the Camera Server to capture video prior to the alarm/event, as well as after the alarm/event. Shall be selectable from a list of values ranging between 0 seconds and 5 minutes.
- Retrieval: The CCTV application should allow retrieval of data instantaneously or any date / time interval chosen through search functionality of the application software.
- Storage: Data storage should be at a central location in the facility. The capacity of the storage should be equal to 90 days of recoding of all cameras at 30/12 fps/4 CIF. The system should follow FIFO on recording.

9.3 CAMERA SITE - EQUIPMENT AND INSTALLATIONS

9.3.1 General

The following specifications cover the general requirements of items and services provided at each camera site. Plans showing the location of cameras, equipment and proposed signal routes and types are to be supplied.

9.3.2 Outdoor Equipment Cabinet

Outdoor equipment cabinets must conform to IP65 for environmental protection and electrical safety. Cabinets fitted in secure locations (not easily accessible to the general public) should be fitted with a standard cabinet lock. Roadside cabinets should be secured with anti tamper fixings in addition to the standard cabinet lock.

9.3.3 Camera Mounting Brackets

It is recommended that cameras be placed at a height of 12 ft above ground or as per drawing. A heavy-duty mounting bracket shall be required, specifically and individually designed or selected to support the camera assembly on each structure or premises proposed and capable of easily and safely supporting the proposed camera assembly. High quality rust proof materials shall be used in the construction of the brackets, including fixings, bands, nuts, bolts and screws.

9.3.4 Camera Column (pole)

The camera and associated equipment at each location will determine the choice of camera column or pole required. It is recommended that the standard column provide a camera platform height of

12 ft., however, under certain circumstances, a greater or lesser height may be more appropriate. All the CCTV camera shall be installed or mounted by using the street light Pole as per drawing. However, if any Pole required other than Street light Pole for camera installation, it shall be constructed of galvanized tubular steel in one single column designed to provide a rigid and stable platform for the camera and any additional items such as microwave radio links or equipment. Lattice or tilt-over types are not acceptable.

The column shall safely house any transmission/telemetry equipment, electrical mains power supplies and any other items required to be placed within it. An access hatch suitable for installation and service requirements shall be provided. A secure and lockable cover shall be provided.

9.3.5 Camera/Equipment location

The location of cameras and ancillary equipment and cabling in any area and on buildings or structures shall comply with planning requirements and way-leave agreements obtained by the Group.

9.4 TESTING:

Initial testing: Prior to installation of the system, Contractor shall install Contractor's proposed IP cameras for each type of camera specified in the proposed monitoring locations to demonstrate the image quality. Contractor shall provide temporary power for the initial testing.

Component Testing: Maximum reliability shall be achieved through extensive use of high-quality, pretested components. Each and every component shall be individually tested by the manufacturer prior to shipment.

Tools, Testing and Calibration Equipment: The supplier shall provide all tools, testing, and calibration equipment necessary to ensure reliability and accuracy of the system.

Commissioning: Contractor and Owner shall review video from each camera to confirm image quality and detail from each location at times that most critical to the Owner for surveillance.

9.5 POWER SUPPLY: Contractor's scope shall design and installation of complete power distribution to support PoE IP CCTV system including complete cabling work, dedicated patch panels at each data closet, and required electrical accessories with suitable protection devices from UPS and UPS output to IP CCTV cameras.

9.6 EQUIPMENT DATA:

Submit complete data for approval including, but not limited to, the following :

- Detailed literature, in English, for each type of Camera & other equipment including manufacturer's name, catalogue number, rating, material specification, overall dimensions, operating characteristics and principles, and any modification to a standard product if applicable
- Detailed specification and drawings type including shape, base/mounting flanges, bolts, nuts etc, cross-sections, design criteria and brackets, finishes, provisions for cabling etc.

9.7 SUBMITTALS:

a) Prior to installation the system, Contractor shall submit Shop and Construction drawings for approval:

- Layout of equipment in exact positions with mounting and other details.
- Installation drawing
- Cable connectivity drawings and cable schedule.
- Power distribution scheme.
- Specifications and data sheet for each item.
- List of software and software licenses.
- Test certificates, Internal test reports etc.

b) System Documentation

Upon completion of installation, system supplier shall submit:

- System configuration diagrams in simplified block format.
- Manufacturer's instructions and drawings for installation, maintenance, and operation of all purchased items.
- Overall system operation and maintenance instructions including preventive maintenance and troubleshooting instructions.
- A list of all functions available and a sample of function block programming that shall be part of delivered system.
- Quality Assurance Plan.
- Operation and maintenance manuals.

9.8 SAMPLES:

The Contract shall Submit fully equipped sample of CCTV and other materials or components.

9.9 WARRANTIES

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

During the warranty period, malfunctions or defective works forming part of the installation will be the responsibility of the Contractor to repair, replace or to carry out such works as required to maintain full functionality of the system, such works as required to maintain the system in full order are to be carried out on a regular basis.

SECTION- 10

ACCESS CONTROL SYSTEM

10.1 GENERAL

- 10.1.1 Contractor shall allow for the supply, installation, testing and commissioning of the complete Honeywell ProWatch v4.1 Access Control system as specified and as shown on related drawings and BOQ.
- 10.1.2 The system shall be designed for ultimate reliability and maximum operating efficiency using only the highest quality, fully field proven products.
- 10.1.3 The system components shall have operating environments to allow complete functionality at a temperature of 0 to 50 degree centigrade and a relative humidity of 90 % (non-condensing).

10.4 SCOPE OF WORK

- 10.2.1 Provide complete access control security system including but not limited to the components and equipment as specified in this document.
- 10.2.2 The system shall consist of but not limited to the following:
 - a) Main Control Panel (if required)
 - b) Door controller
 - c) 32" LCD monitor with PC work station
 - d) Door Locks
 - e) Active Switches
 - f) Proximity Card Reader
 - g) RF ID Cards.
 - h) Accessories for interfacing with the building fire alarm system / BMS
 - i) Power supplies as required to the various system components
 - j) Latest release of multiuser version system software
 - k) Integration with Monitoring System via volt free contacts
- 10.2.3 The system shall be an integrated access control system based on an open protocol communications network.

10.3 SUBMITALLS

- 10.3.1 The contractor shall submit the drawings and documents related with access control system for consultant approval and shall include but not be limited to the following:
 - a) Model numbers of all components furnished on the job.
 - b) Manufacturer's original catalog and technical data sheets for all components.

- c) Complete engineered drawings indicating: dimension layout, installation details, single line diagram of entire system, wiring diagram, interconnectivity with other sub systems.
- d) Four (4) sets of the Manufacturer's User's Manuals and Installation Manuals.

10.4 SYSTEM DESCRIPTION

- 10.4.1 The contractor shall appoint a specialist subcontractor for the supply, installation, commissioning and training of Online Access Control System. The proposed products shall be supported by a local distributor / installer with sufficient experience in the industry. Only the equipment approved by the Consultant shall be delivered to site or installed.
- 10.4.2 The system shall include control panels, smart cards and card readers, magnetic door contacts and magnetic locks as indicated on the drawings. The system shall include any additional accessories or parts those are not indicated on these specifications and drawings shall be considered and included to form a fully operational system to the satisfaction of the Consultant.
- 10.4.3 Different control panel configurations for one, two, four six and eight doors controlling shall be available to allow various combinations of card/card reader or keypad inputs, relay outputs, and alarm inputs to maximize system hardware flexibility. Each door shall be provided with a 2-door controller.
- 10.4.4 The Access Control System shall provide the following minimum features:
- a) Instant response to Card Read within 0.25 seconds and reporting on access control monitoring within 2.0 seconds.
 - b) No degradation of system performance in case of a communication loss. All time zones access levels and holiday schedule shall remain operational on such occasion.
 - c) No loss of transaction for system history flues. All panels automatically shall switch to buffer mode, capable of storing 10,000+ events per panel.
 - d) Each panel shall represent one "Intelligent Controller" in the distributed processing network. Each Controller shall use an Intel 80C88 microprocessor as its engine.
 - e) Information shall be downloadable to the panels using either a PC or LAN network. A Computer shall not be necessary for panel operation and may be taken off-line if required, once the system information has been downloaded to the panels.
 - f) For basic system requirements a PC shall simply be used as a Terminal or Window into the System, History Data Logging Device and Data Manager.

- 10.4.5 All panels shall have a built-in reset timer (watchdog circuit) that ~~automatically reboots the panel in the event that the processor is interrupted~~

by a transient surge. When a system processor is reset, it shall automatically request a parameter down load from the Master panel and reboot to its proper working state.

- 10.4.6 If the Master panel is reset, it shall automatically request a parameter download from the PC or LAN. When the Master is a modem location, it shall automatically dial the PC or LAN, via modem, and receive the parameter downloaded.
- 10.4.7 The doors shall operate Fail safe/Fail Secure as per consultant requirements on site.

10.5 SOFTWARE DETAIL

- 10.5.1 The access control systems PC or LAN application software shall be a true 32-bit access control software that utilizing a Windows 8.1 or Windows 10 operating system and combining point monitoring, control with integral Photo I.D. Badging, Guard Tour, Time and Attendance, Alarm Graphics and system integration (interfacing) for CCTV, BMS, Fire, etc. The application software shall be capable of running on either a single PC or on a multi-user Local Area Network.
- 10.5.2 TCP / IP network communications shall be utilized to provide user interaction and real-time monitoring to workstations or PCs located anywhere on a LAN or WAN. The software shall be password word protected to allow for operator specific capabilities at each workstation. The access control system application software shall incorporate Point and Click operation with hierarchical tree views and pop-up menus for ease of use.
- 10.5.3 I/O monitoring and control shall be achieved through animated icons that depict the real-time status of each input or output. The software shall also allow I/O points to be assigned to an Override Group, allowing for multiple inputs and outputs to be monitored and controlled via a single icon.
- 10.5.4 The access control system application software shall have the ability to support and configure Graphic alarm maps and will provide detailed information regarding any I/O point within the system. The graphic maps will display real-time status of each I/O point and will allow the system operator to perform manual overrides directly from the map.
- 10.5.5 Photo I.D. Badging shall be integral feature of the access control application software. The system shall have the ability to import card holder images from a file, capture images from a live video source, or work with any device providing a TWAIN interface. The application software shall have the ability to print and store multiple images.
- 10.5.6 Automatic Image Recall and Verification upon card use shall be an integral feature of the access control Windows 8.1/10 application software. The software must support signature pads, finger print scanners, bar code and magnetic stripe encoding. A suitable Card printer using latest technologies shall be supplied with the system, including camera, tripod, video capture card etc.

- 10.5.7 The access control application software shall have the ability to create badge templates by using drag and drop tools and shall incorporate features such as, transparent backgrounds, image ghosting, text centering, text shrink to fit, bring to front, send to back, layering and rotation to any degree. The software shall support single or two-sided color or black and white badges and will permit either one time or batch process printing.
- 10.5.8 The access control application software shall have flexible linking capabilities that allow for any card, input or output in any location throughout the distributed network to link (interlock) with any other input or output within that location. The creation of mantraps shall be a matter of software programming and will require no additional hardware.
- 10.5.9 The access control application software shall provide the ability to create simple or extensive Custom History Reports. The report function shall allow the operator to define reports by cardholder, input, output, events or any combination of these items.

10.6 INTELLIGENT CONTROL PANEL (PW 6000 Intelligent Controller)

- 10.6.1 The Intelligent Controller Panel (ICP) unit shall have the following specifications:
- a) 9600 Baud - Dial-up / 38400 Direct
 - b) 200 + Card, Reader and Keypad Formats
 - c) Flexible I/O Linking
 - d) Removable Terminal Blocks
 - e) Supports 4 State Input Monitoring
 - f) UL 294 Listed and CE approved
- 10.6.2 Each ICP unit shall be comprised of a processor and an I/O-termination board. This combination will form an Intelligent Controller Panel (ICP). The ICP shall contain an 80C88 processor and RAM chips. The I/O portion shall contain the power supply and field wiring terminals.
- 10.6.3 The ICP shall be capable of operating as a fully distributed processing control panel that retains all data necessary for system operation in its own RAM. The ICP shall have the ability to check its database and make decisions about output control, alarm monitoring and time zone changes. The ICP shall have an integral real-time clock that allows all time zone events to continue even when PC communications are not available.
- 10.6.4 The ICP unit shall have the ability to be programmed as either a Master or Slave in a distributed network. A dipswitch selection feature within the ICP shall determine the Master or Slave mode of operation. The first ICP of each location shall be designated as the Master. The Master panel will have the ability to communicate with PC, LAN and Slave panels simultaneously.

- 10.6.5 The ICP unit shall have 16 E.O.L. supervised inputs for point monitoring. The input shall have a status LED to indicate electrical status regardless of the armed state. The inputs on the ICP shall support two; three and four state monitoring, with five input configurations to choose from. Inputs configured for three and four state circuits shall support trouble reports.
- 10.6.6 The ICP unit shall be compatible with Wiegand, Barium Ferrite, Proximity, Bar Code, Magnetic Stripe, Biometrics and Smart Card readers and shall allow any combination of reader technologies to be used in the same system. The ICP unit shall allow keypads to be added with readers in order to create a card and PIN controlled entry point.
- 10.6.7 There shall be a highly flexible and extensive Programmable-linking feature that allows an input to link to other inputs or to outputs. The Programmable Linking feature shall also allow outputs to link to other outputs or to input. The ICP unit shall also provide the ability of assigning access codes to link to either inputs or outputs or both. The Linking feature shall allow the ICP to be used for a multitude of applications including Floor Select Elevator Control, HVAC Control and Alarm Annunciation and Control.
- 10.6.8 The ICP unit shall have a standard configuration of 64K of ROM and 64K of RAM. The RAM memory allocation shall be dynamic and set for optimum use by the Host PC, or LAN operator according to the data entered for each location. The RAM memory shall be expandable from 64K up to 192K by adding up to four 32K RAM chips.
- 10.6.9 The Pre-Warn Output of the ICP unit shall be used to indicate the controlled door is being held open and about to go into alarm.

Temperature Operating	32 to 131 F
Storage	-35 to 150 F
Humidity	Operating 0 to 95%, relative
Supply Voltage	16.5 VAC 40VA
AUX DC Voltage	12-24 VAC 40VA
Power Requirements	33 Watts (.031 BTU)
Panel Current Draw	550 ma
Output Voltage	Panel outputs shall provide a regulated voltage. The AUX DC output provides an unregulated voltage from the AUX AC supply voltage.
Panel Output – 1	12VDC 1A Fused
Panel Output – 2	9 VDC 300ma current limited
Panel Output – 3	5 VDC 300ma Fused
Panel Output – 4	12-24 VDC 3A Fused
Inputs	EOL Supervised 16
Outputs	Form C Relays 8
Relay Output Ratings	5 Amp 24 VDC / 5Amp 115VAC
LED Outputs	6 - 3 per reader

Pre-Warn Outputs	2 - 1 per door
Controlled Entry Points	Two Card Reader or Keypad
Charging Output	Trickle Charge
	13.5 VDC 500ma Fused

- 10.6.10 Inputs 7 and 8 shall be used for the door position switch and exit request unless otherwise programmed. All Inputs support two, three and four state monitoring and five programmable circuit types.
- 10.6.11 Standby time ICP unit under Maximum Load shall be 3.25 hours. The ICP shall tests the integrity of the Battery once every 24 hours.
- 10.6.12 The transaction buffer shall automatically adjust to use any RAM not allocated for system parameters. Upon completion of a download from PC or LAN to a Master ICP, the Event Buffer size is reported to the PC or LAN and displayed on the Monitor Screen(s).
- 10.6.13 ICP Packaging the ICP unit shall be supplied complete with Processor Board, I/O board, Ribbon Cable, 16 EOL Resistors, Enclosure, Lock and Key, Wiring Label, Anchors and Wire Ties, Tamper Switch, and an External AC Power Indicator.

10.7 ACCESS RF ID CARD

- 10.7.1 Contact less, multiple applications ISO credit card size card with high-speed read/write (106 kbits/s) and data exchange with the reader as specified in ISO 7816 shall be used in the system.
- 10.7.2 The cards shall be plain white, Wiegand encoded, gloss finish on both sides and shall be directly printable on both sides.
- 10.7.3 The read distance of the cards using relevant proximity reader shall be up to 10 cms, with fast transaction time of less than 100 m/s.
- 10.7.4 Cards shall be constructed of laminated PVC, with data retention on temperature range of - 25 Deg. C to +70 Deg. C.
- 10.7.5 300 nos. cards to be supplied with video badging.

10.8 PROXIMITY CARD READER (HID 900NWPNEK00483 52bit / 32 bit CSN)

- 10.8.1 The reader shall encrypt all 13.56 MHz/125KHz RF data transmission between the card and reader using industry standard encryption techniques and advanced key management.
- 10.8.2 The system shall be equipped with proximity card readers with keypad and a tamper switch as shown on the drawings. It shall be possible to use different types of cards / readers in the system.
- 10.8.3 The Proximity Reader shall be a Uni-Directional Indoor or Outdoor unit designed for mounting on any surface including solid metal. The reader can be mounted
-

behind most building materials such as sheet rock, or it can be mounted with its side against a metal door or window frame. This unit shall have a read range of more than six cm.

- 10.8.4 The Proximity Reader shall be a unitized reader with a standard Wiegand output that connects directly to the access control panel without the use of an interface module. The reader shall be designed to work with any HID proximity cards.
- 10.8.5 The card reader shall read the encoded data from the access card and/or transponder and transmit the data back to the host panel, giving an audible and visual indication of a properly read card and shall have a hold line that will buffer a card read until the panel has asserted that the information can be sent up line.
- 10.8.6 The card reader shall have a re-present mode in which the card must be taken from the reader field for one second before being read again. This feature is required to prevent multiple reads from a single card presentation.
- 10.8.7 The reader shall be powered from the access control panel (ICP) directly.
- 10.8.8 The card reader shall have the following reader configuration options:
 - a) Reader beeps and flashes green on a card read, LED normally red, single line control of LED.
 - b) Reader flashes green on a card read, LED normally red, single line control of LED.
 - c) Reader beeps on a card read, LED normally red, single line control of LED.
 - d) Reader beeps and flashes green on a card read, LED normally off, red and green LEDs controlled individually.
 - e) Reader flashes green on a card read, LED normally off, red and green LEDs controlled individually.
 - f) Reader beeps on a card read, LED normally off, red and green LEDs controlled individually.
 - g) Beeper and LED are controlled by host only, LED normally off, red and green LED controlled individually.

10.9 BADGE/CARD PRINTER

- 10.9.1 Card/badge printer to direct graphic print the cards with necessary software, camera, tripod and scanner shall be provided with the system including supplies for printing 1000 cards. The card printer shall be with following minimum specifications:

Print Method:	Dye-Sublimation/Resin Thermal Transfer
Resolution:	300 dpi (11.8 dots/mm)
Colors:	Up to 16.7 million
Print Ribbon:	Full color with resin black, YMCKO
Print Speed:	8 seconds per card / 450 cards per hour 35 seconds per card / 102 cards per hour
Accepted Standard Card Sizes:	CR-80 (3.375" x 2.125" / 85.6mm x 54mm) CR-90 (3.63" x 2.37" / 92mm x 60mm)
Maximum Print Area:	3.37" L x 2.14" W / 85.5mmL x 54.5mmW
Maximum Card Width	2.1" to 2.63" / 53mm to 67mm
Maximum Card Length	3.25" to 3.625" / 82mm to 92mm
Maximum Card Thickness:	.010" to .060" / .254mm to 1.5mm
Card Types:	PVC or polyester cards with polished PVC finish.
Card Capacity:	100 cards (.030") or 300 cards (.010"); auto or manual feed
Display:	LCD display shows printer status and diagnostic error
Software Drivers:	Windows® 8.1 & 10
Interface:	Standard 8-bit parallel (ECP compatible) or Macintosh
Operating Temperature:	65° to 80 °F / 18° to 27°C
Humidity:	20-80% non-condensing
Dimensions:	8.4"H x 13.6"W x 12.7"D / 213mmH x 345mmW x
Weight:	16.3 lbs. / 7.4kg
Agency Listings:	Safety: UL 1950, CSA C2.2 and TÜV-GS (IEC-950) Emissions: FCC Class B, CRC c1374, Class B and TÜV-
Supply Voltage:	100-240 VAC, 2A
Supply Frequency:	50 Hz / 60 Hz
Options:	* USB Interface Cable * Ethernet Interface Adapter

10.10 MAGNETIC DOOR CONTACT

10.10.1 Magnetic door contacts shall be provided on all doors equipped with the access control system and the doors indicated in the drawing to monitor the door status. It shall be possible to arm and disarm the doors to be monitored manually or using the time zones in the system.

10.10.2 The door contacts shall meet following minimum specifications:

Contact Type	SPST, Gold under plating and deactivated Rhodium outer plating
Switch Cycles	50 Million
Operation Gap:	One Inch
Colors	White, Brown, Grey
Construction	Weatherproof, high impact ABS plastic
Rating	0.1 Amp / 100 VDC

10.11 ELECTRO MAGNETIC LOCK

10.11.1 The electromagnetic lock provided shall be suitable with the door type and shall meet following minimum specifications:

Holding Force	:	2700 Pounds (Main Door and Car Parks)
Operation	:	Fail Safe (Door shall remain Open on Power Failure)
Locking	:	Using Internal circuitry to sense door closure
Door lock delay time	:	2 to 6 seconds
Lock Status monitoring	:	Using built in N.O./N.C. SPDT contact rated 1 Amp / 24 VDC
Magnet Face Plate	:	268 x 35 x 6
mm Magnet Housing Cavity:		219 x 35 x 27
mm Armature Face Plate	:	268 x 35 x 6
mm		
Door Gap	:	3 mm Maximum
Power Supply		12 to 28VDC (Max.1.8 Amp. Pull/500 mA Hold)

10.11. WARRANTY

10.11.1 The product shall be warranted to be free from defects in material and workmanship under normal use for a period of one year from the date of commissioning or final acceptance.

END OF SECTION

SECTION- 11

VEHICLE SECURITY SYSTEM

11.0 SYSTEM OVERVIEW

The Boom Barrier Access Control System is designed to regulate vehicular entry and exit in secure premises. The system consists of an automated motorized boom barrier, integrated RFID-based access control, manual override capability from a guard room, and centralized software for real-time monitoring and event logging. The complete system shall be supplied, installed, tested, and commissioned by the contractor and shall include training, documentation, and warranty services.

11.1 General Requirements

11.1.1 The system shall be rated for outdoor installation and must provide a minimum protection class of IP54 against dust and water ingress.

11.1.2 All supplied components shall be CE or UL certified and compliant with relevant IEC and ISO standards.

11.1.3 Each boom barrier shall be capable of a minimum of 5,000 operation cycles per day.

11.1.4 The system shall support:

- Integration with RFID-based access control systems
- Optional license plate recognition (LPR) systems
- Emergency release functionality

11.1.5 The contractor shall provide complete documentation, including:

- Shop drawings
- As-built drawings
- User manuals
- Training for operation and maintenance staff

11.1.6 Electrical input requirement: 230V AC, 50 Hz

11.1.7 Environmental Considerations

Given the installation location is near a marine environment (Emaar Pakistan), the system and its components must be designed to withstand corrosive coastal conditions, including:

- High humidity (up to 95%)
- Salt-laden air
- UV exposure and direct

sunlight The following provisions

shall apply:

- Enclosures and external components shall be constructed from marine-grade aluminum, stainless steel (SS 316 preferred), or corrosion-resistant galvanized steel, with powder coating or anodized finish.
- All cables and conduits must be UV-rated and suitable for outdoor/marine-grade applications. Operating temperature: -10°C to +55°C
- Storage temperature: -20°C to +70°C

11.2 Software Requirements

11.2.1 A centralized management software shall be provided to enable real-time monitoring, control, and event logging.

11.2.2 The software shall offer the following features:

- Adding and removing RFID users
- Manual barrier override commands
- Export of event logs in Excel or PDF formats
- Management of multiple barriers and sites from a single interface
- Guard room override and manual control interface.

11.2.3 Communication protocols must include Ethernet and USB as standard, with optional integration to third-party systems or BMS via Modbus/TCP or API interface.

11.2.4 4 Software licensing must be perpetual, and support a minimum of three (3) user accounts.

11.3 PC Hardware Requirements

11.3.1 The control software must be compatible with Windows 10/11 (64-bit) operating systems.

11.3.2 Minimum hardware specifications for the workstation:

- Processor: Intel Core i5 or higher
- RAM: 8 GB
- Storage: 500 GB HDD or SSD
- Network: 1 Gbps Ethernet port
- Monitor: LED display (size mention as per BOQ)

11.3.3 The PC shall be backed by a 650VA or higher UPS to ensure continuity during power interruptions.

11.4 Boom Barrier Unit & Controller

11.4.1 Barrier arm length: up to 6 meters, configurable per site requirements.

11.4.2 Opening and closing time: adjustable between 1.5 to 6 seconds.

11.4.3 Arm construction: rectangular aluminum with reflective tape, and optional LED strip for visibility.

11.4.4 Motor: Electro-mechanical or servo type, with inbuilt thermal protection to prevent overheating.

11.4.5 RFID Reader

- Supported frequencies: 125 kHz or 13.56 MHz
- Reading range: up to 10 cm, adjustable as per tag configuration

11.4.6 Tag type: Passive RFID tags/stickersManual Operation

- Local push-button panel installed in the guard room
- Provision for manual lifting of barrier in case of power failure
- Emergency stop switch included for immediate halt during emergencies

11.4.7 Safety Features

- Vehicle presence detection via loop detector or IR beam sensor
- Auto-reverse mechanism if obstacle is detected
- Manual unlock key provided for emergency access

11.5 Warranty and Support

11.5.1 The system shall be covered under a comprehensive warranty of minimum two (2) years from the date of commissioning.

11.5.2 Warranty shall cover:

- Replacement of defective components
- Remote and onsite support during the warranty period
- Software updates and patches within the warranty duration.

11.5.3 The contractor shall offer an optional Annual Maintenance Contract (AMC) post-warranty, including preventive and corrective maintenance.

11.6 Contractor's Scope of Work

The entire Boom Barrier Access Control System shall be in the contractor's scope, covering the following activities:

- Supply of all equipment, accessories, mounting hardware, wiring, control panels, PC, software, safety sensors, and RFID systems
- Installation of all system components including civil work (e.g., excavation, foundation bolts, support poles, trenching, conduit laying) as required.
- Testing and calibration of equipment to ensure proper functioning of mechanical, electrical, and software elements
- Commissioning of the system including user training, RFID programming, network setup, and integration with any existing access control infrastructure.
- Submission of final as-built drawings, configuration files, manuals, and warranty documents

SECTION - 12

EARTHING SYSTEM

12.1 Scope of Work

The work under this section consists of supply, installing, testing and commissioning of all material and services of the complete earthing system as specified herein, as shown on the Tender Drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact route, location and position of the electrical lines and equipment.

The Earthing system shall also comply with the General Specifications for Electrical Works and with other relevant provisions of the Tender Documents.

12.2 General

The work will include supply, installation, testing and commissioning of Earthing System and conforming to the technical specification including the termination of the earth conductor from each earth pit to the main earth bus inside the building.

The earthing system consists of Earth Electrodes, Earthing leads, Earth connecting points, Earth testing point, Earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

12.3 Applicable Standards/ Codes

The latest editions of following standards/ codes shall be applicable for the materials in scope of this section:

- BS95 Earthing clamps
- CP1013 Earthing
- BS2874 Nuts. Bolts, washers, screws and rivets for use on copper
- BS1433 Hard drawn bare copper conductor for earthing
- BS6346 PVC insulated cables.

12.4 Materials

The Earthing system shall consist of Earth electrodes, Earthing leads, Earth connecting point, Earth continuity conductor and all accessories necessary for the satisfactory operation of the associated electrical system.

12.4.1 **Grounding Electrodes**

The grounding electrode shall be of Copper Rod 20 mm dia 3 m long. The contractor shall carry out resistivity test over the site area and submit the result to the Engineer. The number of grounding electrodes and the method of installation shall be approved by the Engineer depending on test results.

12.4.2 **Earth Connecting Points**

The earthing leads from the rod shall terminate at the earth connecting points which shall be of tinned copper bar, rectangular in shape, having dimensional 250mm x 50mm x 8mm, installed on the wall of the inspection chamber at the ground level. Further connections to respective locations shall be made from this bar by earth conductors of various sizes as shown on the drawings.

12.4.3 **Inspection Chamber**

At the ground level an inspection chamber shall be provided. The inspection chamber sizes and detail shall be as per drawing. The cover shall have "EARTH BELOW" inscribed on its top. The Contractor shall provide and install the cover flush with the ground level.

12.4.4 **Earth Lead/ Earth Continuity Conductor**

The earthing lead shall connect the earth electrode to earth connecting point or equipment. It shall be single core PVC or hard drawn bare Copper Conductor as per drawing.

12.5 **Installation of Earth Electrode (Copper Rod)**

12.5.1 The earthing system by copper rod shall consist of 20mm dia and 4 meter long copper rods. These shall be of 99.9% purity copper. These shall have screw able head to accommodate other rods in series with the help of dowel as is shown in the drawings. The driven head shall consist of a hardened tip. These rods shall be connected to the earthing lead whose other end shall be connected to the earth connecting points to be provided in the inspection chamber. From the earth connecting points earth connection shall be made to individual point as marked in drawing.

12.5.2 **Installation of Earth Electrode where the condition not suitable for achieving Earthing ohms**

Where the rock lie just below the surface or water table are very deep then earth electrode shall be installed through drilling or digging method. Due to certain ground conditions make it difficult to obtain a reliable earth resistance, whilst particular installations may require a very low resistance, in such cases, Marconite concrete shall be used as backfill for a conventional earth rod achieve a lower earth electrode resistance. The method already is shown in the miscellaneous drawing

12.6 **Equipment Grounding**

a. **Non-current carrying metal parts:**

Bond and ground non-current carrying metal parts of electrical apparatus and equipment provided under work of any section of specifications.

b. **Grounding of Fence:**

All metallic fences shall be grounded by driving earth rods at a distance of 50 meter.

12.7 **Earth Resistance & Inspection Test**

Earth resistance test will be made by the Contractor on the complete earthing system, separating and reconnecting each earth connection. 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. Electrical resistance of ECC together with the resistance of electrode to any other positioning the complete installation will not exceed one Ohm.

The earth resistance test shall be performed as per Standard requirements. Where more than one earth electrode is installed the earth resistance test of each electrode will be measured by means of resistance bridge instrument. Complete system shall be tested for continuity and earth resistance. The combined earth resistance at any point in the system shall not exceed 5 Ohms maximum.

Earth resistance test shall be made by the Contractor in the presence of the Engineer. The test result shall conform to BS 7430 (formerly CP 1013) and BS 6651 (Formerly CP 326). To obtain the desired result more earth rods shall be provided.

SECTION - 13

TESTING OF ELECTRICAL EQUIPMENT

13.0 **GENERAL**

Upon completion of the installation the Contractor shall perform field tests on all equipment, material and systems all tests shall be conducted in the presence of the client for the purpose of demonstrating equipment or system compliance with specifications.

The Contractor shall furnish, install and maintain all tools, instruments, test equipment, material, connections, etc and furnish all personnel including supervision and "Standby" labour required for the testing, setting and adjustment of all electrical facilities and their component parts, including putting the same into operation.

All tests shall be made with the proper regard for the protection of the equipment and the Contractor shall be responsible for adequate protection to all personnel during such tests.

The Contractor shall record all test values of the tests made by him on all equipment, giving both "as found" and "as left" conditions. Three (3) copies of all test data shall be given to the Engineer Incharge for record purposes.

The witnessing of any test by the Engineer In charge do not relieve the Contractor of his guarantees for materials, equipment and workmanship as specified in the Conditions of Contract.

13.1 **INSULATION TEST**

Insulation resistance tests shall be made on all electrical equipment, using a self-contained instrument such as the direct indicating ohm-meter of the generator type Direct current potentials shall be used in these tests and shall be as follows:

Circuit under 220 volts – 500 volts test
Circuit 220 volts to 400 volts – 1000 volts test

The minimum acceptable insulation resistance value will be 5 Mega

ohms. The test equipment for insulation testing will be furnished by

Contractor.

Before making connections at the ends of each cable run, the insulation resistance test of each cable shall be made. Each conductor of a multicore cable shall be tested individually to each other conductor of the group and also to earth. If insulation resistance test readings are found to be less than the specified minimum in any conductor, the entire cable shall be replaced and the new cable tested.

All transformers, and switch gear shall be given an insulation resistance measurement test to ground after installation but before any wiring is energized 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 that specified above 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 have been necessary and the insulation resistance reading taken after the correction has been made it should satisfy the requirements specified herein. Repeated insulation resistance maintenance test shall be made twice and at least 12 hours apart. The maximum range for each reading on the 3 successive tests

shall not exceed 12 hours apart. The maximum range for each reading on the 3 successive tests shall not exceed 20% of the average value. After all tests have been made successfully, the equipment shall be reconnected.

13.2 EARTH RESISTANCE TESTS

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

The electrical resistance of the ECC 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.

13.3 OPERATING TESTS

Current load measurement shall be made on equipment and on all power and lighting feeders.

The current reading shall be taken in each phase wire and in each neutral wire while the circuit or equipment is operating under actual load conditions. Clip-on ammeters may be used to take current readings. All light fittings shall be tested electrically and mechanically to check whether they comply with the standard of specifications.

The distribution system shall be checked and tested as per manufacturer's instructions and in the presence of the Employer or his representative.

After any equipment has been tested, checked for operation etc, and is accepted by the Project Engineer's representative the Contractor shall be responsible for the proper protection of such equipment for assurance that subsequent testing of other equipment of systems do not disturb the completed work.

13.4 VISUAL INSPECTION

Visual Inspection to verify that the Electrical equipment has been correctly installed in accordance with the design with correctly rated protection devices and bonding that no visible damage exists.

SECTION - 14

LIST OF APPROVED MANUFACTURERS / SUPPLIERS

All equipment shall conform to relevant specifications and shall be from approved sources indicated below. However, in every case the contractor shall submit complete technical details of the equipment and material and obtain Engineer's approval prior to delivery on site. Where "Approved Equivalent" is indicated, it shall be at the sole discretion of the Engineer to accept or reject the alternate proposal submitted by the contractor. In the event, "Approved Source" of any equipment / material is not indicated below the contractor shall obtain the approval of the Engineer prior to placing order on any supplier. During the execution stage if the material from any supplier is found defective/Sub-standard the Engineer reserves the right to ask the successful bidder to replace his choice of manufacturer/ supplier for that particular equipment.

A) - EQUIPMENT / MATERIAL FOR BUILDING INTERNAL ELECTRICAL WORKS		
Sr. No.	EQUIPMENT / MATERIAL	MANUFACTURER / SUPPLIER
1	L.V Wire & Cables	Pakistan Cables Limited / Fast Cables / Newage Cables
2	PVC Conduit and Accessories	Galco / Dadex / Jeddah
3	Back Boxes, Pull Boxes Junction Boxes etc.	Hussain & Co / Ezzi Engineering
4	Furniture Boxes/ Technology Boxes	Legrand / Clipsal /
5	Circuit Breaker	Schneider, ABB, Terasaki
6	Panel Indication LED Lights	Schneider / Camsco
7	Switch and sockets	MK / Legrand
8	Data, Telephone and TV Cables	Corning (3M) / Vevanco / Schneider (Clipsal)
9	Light Fixture	Britlite / ST Solution / Osram / Peirlite
10	Cable Trays / Trunking	EZZI Engineering / Hussain & Co / Electro line
11	Closed Circuit Television (CCTV)	Hikvision / Dahua
12	Access Control System	Virdi / Equivalent, as approved by the Consultant
13	Fire Alarm System	Esser Honeywell / Anim / Zeta / Gents
14	Isolator	Schneider / Katko Terasaki
15	Telephone Junction Boxes	Hussain & Company / Karimi Electro-Mech
16	Steel Conduit and Accessories	Hilal Industries / NADPK / International Industries
18	Auto Hand Driers	Siemens or Approved Equivalent by Consultant
19	Data & Voice Rack	Infinity / Clipsal / Panduit / Vinanco
20	Fire Alarm Cable	Draka / Prysmian-UK / Fire cell-Itlay
21	MATV system	SAXTON / Corning ./ Pony
22	Q-Matic System	Wave-Tech, QMS

A) - EQUIPMENT / MATERIAL FOR BUILDING INTERNAL ELECTRICAL WORKS		
Sr. No.	EQUIPMENT / MATERIAL	MANUFACTURER / SUPPLIER
23	UPS On-Line with Batteries	APC by Multilink Engineering ETON by Greaves Pakistan Private ltd, ATTOM by SECURE VISION
24	Walk Through Gate	Garret/ Cea / Snfer ZOAN / Equivalent as approved by the Consultant
25	Glass Flapped Speed Gate (GFSG) Automatic Access Control System	Garret/ Cea / Snfer / ZOAN / Equivalent as approved by the Consultant
26	Turnstile gates, Automatic Access Control System	Garret/ Cea / Snfer / ZOAN / Equivalent as approved by the Consultant
27	LV Distribution Board	Synergy / HH Engineering / Power Engineers

B) - EQUIPMENT / MATERIAL FOR EXTERNAL ELECTRICAL WORKS		
Sr. No.	EQUIPMENT / MATERIAL	BRAND - MANUFACTURER / SUPPLIER
1.	Street Lighting Poles	M/s Munir Industry - Lahore
		M/s Bashir Pipe Industries - Lahore
		M/s Jamal Pipe Industries Pvt. Ltd. - Lahore.
2.	Street Light & Flood Light Fixtures	M/s ST Engineering Solutions (Model: Phantom)
		M/s Pacific Enterprises, Karachi GE Lighting, Model: SMix)
		M/s Britlite Products, M/s Coarts Lighting
3.	Street Terminal Box	ROSA, Poland
		ST Engineering Solutions
4.	Power Cables	Pakistan Cables Ltd.
		Newage Cables (Pvt) Ltd.
		Fast Cables Ltd.
5.	Cable Lugs and Ferrules / Cable Termination Kits / Cable Joints	Raychem
		3 M (USA)
		Cell pack
6.	Street Light Control Panel (LV Distribution Panel)	M/s Synergy
		M/s HH Engineering

		M/s Power Engineers
7.	Contactors / Relays	ABB
		Telemecanique
		National/Finder/Lovato
8.	Circuit Breaker	Terasaki,
		Schneider Electric
		ABB
9.	Indicating Lamps and Push Buttons	Telemecanique, France Fuji, Japan, Revalco, Italy, Lovato - Italy Hager - France
10.	LV Current / Potential Transformers	Carlo Gavazzi, Spain, Revalco, Italy

B) - EQUIPMENT / MATERIAL FOR EXTERNAL ELECTRICAL WORKS

Sr. No.	EQUIPMENT / MATERIAL	BRAND - MANUFACTURER / SUPPLIER
11.	Voltmeters / Ammeters	Saci - Spain, Revalco - Italy, Lovato - France, Kraus & Naimer, Australia, Hobut, UK, Revalco - Italy
12.	Earthing rod, Earth pits, lugs and terminals	Wallis - UK
		Furse - UK
		Erico - USA
13.	uPVC Conduit & Accessories	Beta pipes, Galco, Dadex
14.	CCTV Camera	Dahua
		Hikvision
15.	Cat-6 Patch Panel	Clipsal/ Schneider
		Corning
		Contech
16.	Fiber Cable	Contech / Corning
17.	I.T Switches	Wi-tek/ D link
18.	Led TV	Sony/ Samsung/LG
19.	Cat-6 Cable	Corning / Schneider
20.	Pedestrian Access Control System (PACS)	
a)	RFID Card Reader, FR Cams	Garret/ ZKETCO / Snfer / ZOAN / Soyol/ Dahua /Equivalent as approved by the Consultant
b)	Turnstiles / Flap Barrier - Speed Gate	
c)	Door controller	
d)	Walk Through Gate (WTG)	

PAKISTAN SECURITY PRINTING CORPORATION (PSPC)**N-1 GATE AREA - KARACHI****INTERNAL / EXTERNAL ELECTRICAL & SECURITY SYSTEM WORKS****Technical Specifications****List of Approved Manufacturers / Suppliers**

21	Vehicle Access Control System (VACS)	
a)	Electromechanical Boom Barrier/Bike Barrier	Garret/ ZKETCO / Snfer / ZOAN / Soyol/ Dahua/ Equivalent as approved by the Consultant
b)	RFID / UHF Long Range Reader	
c)	ANPR / LPR Camera	
d)	Traffic Signal Lights	
e)	Vehicle Detection Sensors	
f)	Road Blocker	
g)	Line Scan UVSS	
h)	Tyre Killer	
f)	Manual Boom Barrier	



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Allied Works at Malir, Karachi

Bill of Quantities

NOTE Please QUOTE YOUR RATES IN Form F3 – Price Schedule PART OF THE THIS BID DOCUMENT NOT IN HIS PORTION OTHERWISE BID WILL BE REJECTED THEN & THERE



Summary

**PSPC N-1 GATE
ALLIED WORKS AT MALIR,
KARACHI**

S.NO	ITEM DESCRIPTION	
1	Structure Works	
2	Civil / Interior Finishes & External Development Works	
3	HVAC Works	
4	Plumbing Works	
5	Electrical & Security Equipment's	
APPLICABLE TAX RATE 8%		

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ALLIED WORKS AT MALIR, KARACHI

Structure Works

Bill of Quantities

PSPC N-1 GATE

Allied Works at Malir, Karachi

Structure

S. No.	Description	Quantity		Unit
01.	SITE LEVELING, EXCAVATION, FILL, BACKFILL & ANTI-TERMITE TREATMENT:			
101	Excavation in foundations and trenches in all kinds of soils including all operations of dewatering, leveling, dressing and ramming the excavated surface and throwing earth clear of edges of excavation and stock piling, filling the excavated stuff in 6" layers in excavated pits, depressions, underfloor or where required to and from complete with breaking clods and mechanically compacting to 95% AASHO dry density with a distance of 150 feet all complete as per drawings and specifications including disposal of surplus excavation stuff from site of work or as directed by the Engineer In charge:	4,000	Cft	Cft
102	Earth work in filling with new earth (excavated from outside) in plinth or depression or under floor including all leads and lifts levelling, clod breaking, dressing, watering, consolidating by ramming in layers not exceeding 6 inches in thickness and mechanically compacting to 95% AASHO dry density etc.; complete.	2,500	Cft	Cft
103	Providing and performing anti termite treatment by spraying/ sprinkling/spreading the chemical Dursban TC or approved equivalent to be mixed with water in ratio of 1:6 to make the concentration 1.6%. In case of new work, the treatment will be carried out in 3 repeated operations. First operation @ 5 liters of chemical per sq. m. to be sprinkled on the bottom surface of the excavated trenches and their sides. Second operation @ 5 liters of the chemical per sq. m. when the structure reaches up to GROUND LEVEL and final application with the same ratio will be given on top of back filled earth under floor and around the building. In case when the base concrete of floor is laid in place of first two operations the chemical will be injected on both sides of the walls by making holes at 1'-0" C/C to the maximum			

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ALLIED WORKS AT MALIR, KARACHI

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Structure Works

	saturation at least 3 times and the final application will be applied on top of the base concrete @ 5 liters per sq.m (Note: Payment will be made for the plinth area of the building for all applications as mentioned in the nomenclature).	2,500	SFT		SFT	
104.	Providing and laying 9"/6" thick stone soling of approved quality stone ballast, under Foundation pads & floors and wherever required, consolidating and compacting etc. complete:	2,500	Cft		Cft	
105.	Providing and applying 2 coats of cold-applied emulsified bitumen paint (approved make) of total dry film thickness not less than 1.5mm, on all exposed imbedded concrete surfaces (ie., in contact with earth), including cleaning of surface, and applying primer coat, complete as per direction of Engineer-in-charge.	2,500	Sft		Sft	
02.	CONCRETE PLAIN AND REINFORCED.					
201	Providing and laying C.C. 1:4:8 bed floor over stone soling, using approved quality fine and coarse aggregate including compacting leveling, consolidating finishing and curing etc.; complete:	2,800	Cft		Cft	

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ALLIED WORKS AT MALIR, KARACHI

Structure Works

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S. No.	Description	Quantity		Unit
202	Providing and Laying 1:3:6 cast in situ in foundation, having Fcu= 1500 psi, plinth and wherever required using approved quality fine and coarse aggregate of crushed stone passing 3/4" sieve including form work as per drawing and design, leveling, compacting, rodding, vibrating, and curing etc; complete.	800	Cft	Cft
203.	Providing and laying RCC of specified strength using approved quality crushed stone and fine aggregate in foundation, columns, beams, lintels, roof slab, chajjas, purdi, staircase (waist slab, steps, landing) and any other structural member including all kind of forms, moulds, lifting, shuttering, leveling compacting, rodding, vibrating, finishing, curing etc; complete as per drawings and specifications and as directed by the Engineer Incharge (excluding the cost of steel and its fabrication).			
	a). RCC 1:1.5:3 -Grade B (Fcu = 3750 psi)			
	i) Foundation Pads	1,900	Cft	Cft
	ii) columns	2,950	Cft	Cft
	iv) Hollow Core Roof Slab	6,000	Cft	Cft
	b). RCC 1:2:4 -Grade C (Fcu 3000 psi)			
	i) Slabs, Beams, lintels, pardi, Stairs & Landings.	3,950	Cft	Cft
204.	Construction of in-situ RCC foundation for street light pole as per drawing inclusive of excavation, preparation of subgrade, lean concrete bed, backfill and fixing of 4 nos - J-bolt 3/4" dia. x 24", complete in all respect.	25	No	No
03	STEEL REINFORCEMENT & METAL WORK.			
301.	Providing and Laying reinforcement of ribbed deformed steel bars of minimum yield stress of 60,000 psi of approved manufacturers including straightening, cutting, bending, removing of rust from bars, including wastage and overlaps as are not shown on drawings placing in position on precast CC spacers tying with binding wire complete with cost of steel chairs and binding wire etc; [NOTE: No extra allowance will be allowed for wastage, oversize and steel chairs, as well as steel will made by new billet]:	60,000	kg	kg
302.	Provision, fabrication & installation of specified steel sections as per design & drawings including cutting, welding & all temporary works and arrangement for the successful accomplishment of	2,000	kg	kg

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Structure Works

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	works with safety.					
04.	ROAD & PAVEMENT WORK					
401.	Subgrade preparation: Compaction of existing natural ground/ subgrade by scarring, watering, rolling with power roller to achieve 95% modified AASHTO density, to the required, depth (12") & level, & site clearance /removal & disposal of unwanted material as per direction of Engineer in-charge	24,000	Sft		Sft	
402.	Providing, laying, spreading, and compacting granular sub-base of specified thickness 6", using suitable material (crushed stone, gravel) in layers, including watering, mixing, and grading with a motor grader to achieve minimum 98% modified ASSHTO density.	24,000	Sft		Sft	
No.	Description	Quantity			Unit	
403.	Providing and laying Aggregate Base Course (ABC)of 6" thickness, conforming to NHA, with crushed stone aggregate of approved quality, including screening, mixing, spreading to proper grade/camber, and compaction to 100% maximum modified AASHTO density, using suitable equipment, complete in all respects."	24,000	Sft		Sft	
404.	Providing and applying prime coat with Medium Curing (MC) cutback bitumen @ 0.6 to 1.0 kg/sqm on prepared granular base, inclusive of cleaning, mechanical spraying, and incidental costs	24,000	Sft		Sft	
405.	Providing and laying plant-premixed bituminous carpet at project site, including compaction and finishing to required camber, grade, thickness, and density complete in all respects as per drawings, specifications and instructions of the Engineer In-charge (2" thickness)".	24,000	Sft		Sft	
406.	Providing and laying factory made concrete paver blocks of M-25 grade (or M-40) and 60mm/80mm thickness of approved color, shape, and design, with a 50mm thick compacted sand bed over 6" th. compacted granular sub-base layer (inclusive of subgrade preparatio), & also including filling of joints with sand/filler and compacting with plate vibrator, all complete as per technical specifications and direction of Engineer-in-Charge."					
	1- Parking & road ways -80 mm th, minimum M-40 grade (7000 psi)	11,400	Sft		Sft	



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Structure Works

	2- Walkways & pedestrian traffic - 60mm th. , M25 grade (4000 psi)	6,000	Sft		Sft	
407.	Providing and laying precast concrete kerb / edge block (Grade B) on prepared minimum 4" th. CC bed & backing, inclusive of subgrade preparation , levelling & compacting and fixing in aliegnment , backfill and jointing with CS 1:3 mortar. Complete in all respect.	2,000	Rft		Rft	

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Allied Works at Malir, Karachi

Civil / Interior Finishes & External Development Works

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ALLIED WORKS AT MALIR, KARACHI

Civil / Interior Finishes & External Development Works

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S.N O	DESCRIPTION	QUANTI TY		
1	DISMANTLING WORK			
	Dismantling and removing of existing Block masonry, columns, beams, slabs shrubs, debris and chiseling of plaster (where required), scaffoldings & all material etc. including tools and equipment's, all necessary precautionary measures or any other item which is require to be reuse will be removed meticulously, cleaning of site carting away surplus stuff etc. from site complete in all respect. Note: Contractor must visit the site for clarity of scope of works, before quoting rates, no claims over & above quoted amount will be paid, must be shift, clear & disposal of all debris from site to any lead & retaining designated material by contractor as directed by the Architect / Owner.			
1.1	Existing block masonry	6600 Sft		
1.2	Existing columns	1100 Sft		
1.3	Existing beams	825 Sft		
1.4	Existing slabs	550 Sft		
1.5	Existing Debris removing	1 Job		
1.6	Shrubs removing	1 Job		
2	BLOCK MASONRY WORKS			
	Providing & Laying any size solid block masonry at any level and height using machine made blocks having 1000 psi strength @ 28 days without broken edges using minimum 1/2" wide mortar joints both horizontally and vertically in cement sand mortar 1:4 with raking of joints from both the sides, the Job includes Two 3/8" Dia steel bars of 2'-0" length on both sides of wall at every 2'-0" height for anchoring of masonry into RCC			

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	columns and walls, making openings for doors, windows and others, making chases for services and electrical conduits / pipes, hacking of existing surface for bonding where necessary along with curing, scaffolding, wastages, forming control joints etc. Complete in all respect as per drawing and as instructed by the Architect.			
2.1	6" Thick block masonry	18225 Sft		
2.2	4" Thick block masonry	2015 Sft		
2.3	Bracing Beam (Size as per requirement)	50 Rft		
2.4	RCC lintel (Size as per requirement)	50 Rft		
3	PLASTER WORKS			
	Providing and applying of 1:4 cement sand plaster 1/2" ~ 3/4" thick at any height on internal and external surface of slab, walls, columns, beams, doors and windows jambs using best quality O.P.C, including 8 inches wide galvanized metal lathe of 18 gauge at joints of structure with block masonry, conduit chases, grooves where required, smooth trowel finish in line, level, plumb along with curing, scaffolding, chiseling, filling of cracks, hacking / chipping of existing surface for bonding where necessary, wastage, etc., complete in all respect as per Architect's satisfaction.			
3.1	Internal Plaster	31568 Sft		
3.2	External Plaster	23756 Sft		
3.3	Pudlo Plaster 3/4" ~ 1" (tanks)	675 Sft		

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S.N O	DESCRIPTION	QUANTI TY		
4	FAIR FACE PLASTER			
	Providing and applying 3/8" thick fair face cement sand plaster (White + Grey cement) in approved ratio on external surface with 5/8" thick rough base plaster, including grooves making same as existing building, in line, level, plumb, curing, scaffolding, hacking / chipping of existing surface for bonding where necessary, wastage, etc, complete in all respect, grooves where required, smooth trowel finish in line, complete in all respect as per Architect's satisfaction.			
4.1	Fair Face Plaster	6300 Sft		
5	CEMENT CONCRETE FLOOR			
	Providing, laying, average 1½" ~ 2" thick Flooring (1:2:4) of 2000 psi compressive strength under any type of flooring using best Quality O.P.C and local approved quality sand and crushed stone, with necessary arrangements where required excluding base of tiles complete in all respects as per approval of Architect.	4604 Sft		
6	CEMENT CONCRETE RAISED FLOOR			
	Providing and laying given size of cement concrete raised floor in the ratio of 1:3:6 (1 - Cement, 3 - Sand & 6 - Aggregate) having 1400 psi compressive strength, using best quality of Ordinary Portland Cement (OPC), local approved quality sand and crushed stone, with necessary arrangements where required excluding base of tiles and wastages etc. Complete in all respects as shown in drawing and as directed by the Architect.			
6.1	8" thick (toilet area)	213 Sft		
6.2	4" thick (Pantry area)	198 Sft		

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7	WATER-PROOFING			
7.1	Providing & applying polymer-modified asphaltic waterproof coating (Noor chemical or BASF) for pantry, toilet floor & wall. Complete in all respect as per drawing, specifications and directed by the Architect.	2000 Sft		
7.2	Providing & laying RL-400, 4 mm thick HDPE finish waterproofing membrane system on Sub structure along with prior cleaning , free of dust and extra concrete before applying primer on the prepared surface. Complete in all respect as per drawing, specifications and directed by the Architect.	1500 Sft		
7.3	Providing & laying RLG-400, 4 mm thick granular finish waterproofing membrane system on roof along with prior cleaning , free of dust and extra concrete before applying primer on the prepared roof surface. Complete in all respect as per drawing, specifications and directed by the Architect.	2304 Sft		
8	M.D.F BOARD PARTITION CABIN			
	Provide and fix in position full-height partition 4-inch thick consisting of 1/2" thick MDF board sheet screwed to both sides of the partial wood framework and including the cost of three coats of approved shade of paintwork, making grooves at sheet joints, cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect. NOTE: Use MDF board, such as ZRK or an approved equivalent. The filling, primer, putty, and paint are used by Kansai / Jotun or the approved equivalent.	1 Job		

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S.N O	DESCRIPTION	QUANTI TY		
9	PORCELAIN TILE ON FLOOR			
	Providing and Laying of full body Porcelain Tiles Flooring consisting of cut to size (as per drawing) with approved quality of dry bond on already laid cement concrete floor, chipping / chiseling of existing floor (if required) to maintain level, setting the tiles with neat and clean, 1mm to 3mm groove filled with approved water proof grout as per thickness, specifications & instructions according to design and pattern including floor tile skirting, protect / cover tile, curing, cleaning, wastages and cartage etc. Complete in all respect as shown in drawing, details and as directed by the Architect. Use Dry Bond: Recesschem or approved equivalent. Use Grout: Recesschem / S.tiles or approved equivalent			
9.1	Mat Tile Size for G.F Toilet Lobby: 2' - 0" x 2' - 0"	120 Sft		
9.2	Mat Tile Size for Balcony, store, lobby, passage and pantry: 2' - 0" x 2' - 0"	594 Sft		
9.3	Mat Tile Size for Toilet: 2' - 0" x 2' - 0"	405 Sft		
9.4	Ceramic Tile for Janitorial, Pantry base cabinet 8" x 8"	99 Sft		
9.5	Ceramic Tile for tanks floor 8" x 8"	198 Sft		
10	PORCELAIN TILE ON WALL			
	Providing and Laying of full body Porcelain Tiles on wall with approved quality of Dry bond on RCC or masonry walls, placing the tile with 3mm groove filled with approved water proof grout as per thickness specifications & instructions, as per design and pattern including stainless steel bar drilled into the center of tile and tie from wall and fill the area with epoxy, protect / cover tile, curing, cleaning, hacking / chipping of existing surface for bonding where necessary, tile spacer,			

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	wastages and all equipment etc. Complete in all respect as per drawing, details and as directed by the Architect. Use Dry Bond: Ressichem or approved equivalent			
10.1	Polished Porcelain Tile Size for Pantry: 2' - 0" x 2' - 0"	40 Sft		
10.2	Polished Porcelain Tile Size for Toilet: 2' - 0" x 2' - 0"	2277 Sft		
10.3	Ceramic Tile for tanks wall 8" x 8"	540 Sft		
11	GYPSON BOARD SUSPENDED CEILING			
	Providing and installation of suspended ceiling consisting of 12mm thick gypsum board with approved shade of Matt Enamel paint and galvanized iron framework, suspension adjustable clutch wire hanging system, including ¼" x ¼" aluminum U channel at edges of the ceiling, cutting opening for light fixtures, light pelmet, slits, fiber tape on joints, A/C diffusers, A/C access panels wastage, hardware, scaffolding, lifting, etc. Complete in all respects conforming to the requirement of the drawing and as directed by the Architect. Gypsum Board : Elephant Brand / DFB or approved equivalent. Paint Work : Kansai / Jotun or approved equivalent. Note: In the process of billing only length and breadth will be measure.	800 Sft		
12	PRE-POLISHED GRANITE			

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	Provide and lay 3/4" thick pre-polished (grey) granite with bullnose edges of the approved sample over tread and riser for stairs steps, external steps, internal steps planter wall, bench, ramp, and sill with 1:4 cement sand mortar base of required thickness to achieve a minimum overall finished floor thickness of approximately 2", setting the granite with neat cement mortar, grouting the butt joints approved color of waterproof grouting (by Ressichem or approved equivalent) including 1/8" thick "V" grooves over steps, curing, cleaning, chipping, hacking of existing surface for bonding where necessary, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by the Architect.			

S.N O	DESCRIPTION	QUANTITY		
12.1	G.F Waiting Area, F.F conference, meeting rooms & lobby: 2' - 0" x 2" - 0"	3769 Sft		
12.2	Entrance & Exit	257 Sft		
12.3	Staircase	371 Sft		
12.4	Window Sill	95 Sft		
13	FLAMED GRANITE			
	Provide and lay 3/4" thick flamed (grey) granite of the approved sample over ramp with 1:4 cement sand mortar base of required thickness to achieve a minimum overall finished floor thickness of approximately 2", setting the granite with neat cement mortar, grouting the butt joints approved color of waterproof grouting (by Ressichem or approved equivalent) including 1/8" thick "V" grooves over steps, curing, cleaning, chipping, hacking of existing surface for bonding where necessary, cutting, lifting and wastages etc. Complete in all respects as shown in			

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	the drawing and directed by the Architect.			
13.1	Ramp	176 Sft		
14	STAINLESS STEEL RAILING			
	Providing, fabricating and fixing in position 3'-0" high stair railing comprising of 3"x1"x16 SWG ellipse (Non magnet Grade 304) stainless steel pipe hand rail, 1/2" dia SS balustrade and 2" x 8mm top & middle 1/2" dia. stainless steel solid bars horizontally (3 No.), including cost of base plate, rawal bolts, rawal plugs, R.c.c cutting (if required), welding, polishing, and fixing to staircases/Ramp, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by the Architect.			
14.1	Entrance & Exit Area	20 Rft		
14.2	Staircase	25 Rft		
14.3	Ramp	74 Rft		
15	SOLID WOODEN MOLDING			
	Provide, make, and install 3/4" x 3/4" thick solid wood molding nailed on the wall at the top edge of the wall tile having an approved shade of paint finish, including pencil round edges on both sides, groove, cutting, lifting, shifting cartages, wastage, all necessary hardware and material used for fixing, etc. Complete in all respects as shown in the drawing and directed by the Architect.	86 Rft		
16	CURTAIN WORK			
	Supply & install white sheer curtains on position consisting with triple pinch pleat, hung on single-track rail, dimensions, cutting, lifting, shifting,			

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	scaffolding, all hardware and material use for fabrication and wastages etc. Complete in all respect as shown in drawing and as directed by the Architect.	297 Sft		
17	FIXED GLAZING			
	Provide and install glazing on position consisting of 12mm thick clear tempered glass with machine polished finish edges fixed with approved quality of 4" x 2" x 2mm thick charcoal gray finish aluminum frame including approved quality of rubber gasket seal, silicone sealant, cutting, lifting, shifting cartages, scaffolding, wastage, all necessary hardware and material use for fixing etc. Complete in all respect as shown in drawing and as directed by the Architect. Use Aluminum Frame, by Pak-Cables, Prime, Chawla or approved equivalent	396 Sft		

S.N O	DESCRIPTION	QUANTITY		
18	MAIN WOODEN DOORS			
18.1	Providing, making, and installing wooden doors, consisting of 1½" thick solid core flush shutter with an approved 3.2mm thick lamination board (Formite / Al-Noor or equivalent) pasted on both sides of 1/8" thick commercial ply including partial wood in-fill framing, 1/4" thick solid oak wood lipping on edges and 2" x 4" solid mahogany wood frame with patam having an approved shade of polish work, all necessary hardware such as heavy-duty stainless steel ball-bearing hinge, lockset, handle, push plate, glue, wastages, lifting, cutting, door cut stopper, door closer, etc. Complete in all respects as shown in the drawing			

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	and directed by the Architect.			
	Door size is 3' - 3" x 8'-0" (Rooms)	13 Nos		
19	TOILET DOORS WITH WOODEN FRAME			
	Providing, making, and installing wooden doors, consisting of 1½" thick solid core flush shutter with an approved 3.2mm thick lamination board (Formite / Al-Noor or equivalent) pasted on both sides of 1/8" thick commercial ply including partial wood in-fill framing, 1/4" thick solid oak wood lipping on edges and 2" x 4" solid mahogany wood frame with patam having an approved shade of polish work, all necessary hardware such as heavy-duty stainless steel ball-bearing hinge, lockset, handle, push plate, glue, wastages, lifting, cutting, door cut stopper, door closer, etc. Complete in all respects as shown in the drawing and directed by the Architect.			
	Door size is 3' - 0" x 7'-10" (Toilets)	7 Nos		
20	GLASS DOORS			
	Provide and install a 12mm thick clear tempered glass frameless door with machine-polished edges, including an approved heavy-duty Stainless steel patch fitting and floor hinge, a long handle (approved) on both sides of the door leaf, including lifting, shifting, and wastage with fixing arrangements, all necessary hardware and material, etc. Complete in all respects as shown on the drawing and directed by the Architect.			
20.1	Entrance and Exit Glass Door	2 Nos		
20.2	Conference Glass Door	1 Nos		
20.3	Meeting Room Glass Door	2 Nos		

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21	EMERGENCY DOORS			
	Provide and fix metal steel fire-rated panic-bar door based on 90 minutes fire retardant consisting of metal steel pressed sheet panel having fire-rated epoxy-based sigma cover 620 and finished with top coat of paint (Jotun / Kansai or approved equivalent), Rock Wool of 80 density in-between metal steel pressed sheet panel along with 22mm thick double glazed safety glass vision panel including 4" thick door frame fixed with galvanized anchor bolt, smoke seal, door closer, stainless steel hinges, an approved sample of handle lock, lifting, shifting and all necessary material complete in all respect as per manufacturer's specification. SOURCE: Khambati's Furniture, Gujrat Steel, or approved equivalent.	1 Nos		
22	MILD STEEL DOORS			
	Provide, fabricate & Install metal door consisting of 1-1/2" x 2" (16 SWG) M.S. main frame with 1-1/4" x 1-1/4" x 1/8" thick M.S. angle shutter with M.S. sheet (18 SWG) wrapped on it, 4" long M.S flat hold fast including two coats of anti rust paint and three coats of approved shade of paint, panic bar locking system and all necessary hardware & material use for fabrication etc., Complete in all respect as shown on drawing, hardware schedule & as directed by the Architect.	3 Nos		

S.N O	DESCRIPTION	QUANTI TY		
23	DOCUMENTATION STORAGE BOX			

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	Provide and fix in a position of low-height storage box for documentation consisting of 3/4" thick MDF sheet screwed to 1"x1" metal framework including the cost of three coats of Matt Enamel paint finish, making grooves at sheet joints (where required), cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	2 Nos		
24	SEATING BENCH			
	Provide, make, and install a bench consisting of 1:2:4 concrete, and applying of 1:4 cement sand plaster 1/2" ~ 3/4" thick on internal and external surface of seat using best quality O.P.C, where required, smooth trowel finish in line, level, plumb along with curing, chiseling, filling of cracks, hacking / chipping of existing surface for bonding where necessary, wastage, etc., complete in all respect as per Architect's satisfaction.	1 Job		
25	M.S STAIRCASE WITH HANDRAIL			
	Providing, making and fixing M.S. Staircase with M.S steps including, 2" dia M.S pipe over 1/2" M.S shaft, 3/8" dia M.S pipe (3 Nos) horizontally, 3/8" thick M.S sheet, 1½" x 1½" dia M.S pipe hand railing comprising of mild steel bar vertically finished with paint of approved shade, complete as shown on drawing # AD - 06 and as directed by the Architect. All the pipes are welded to each others, inclusive of approved shade of spray paint work after applying anti rust paint. Includes mild steel base plates, cover plates, dash fasteners, welding, and fixing to staircases/balconies, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by	36 Rft		

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	the Architect. Note: In the process of billing counter will be measure from actual size of top length only.			
26	MARBLE ON STAIRCASE			
	Providing and laying Marble using best approved quality marble in required sizes laid over base of 2" thick c.c. bed, including white cement sullary with levelling, curing, grinding and polishing. Complete in all respect as shown in drawing and as directed by the Architect.	183.6 Sft		
27	MILD STEEL RAILING			
	Providing, fabricate & fixing M.S. railing in consisting of 2" dia M.S pipe over 1/2" M.S shaft, 3/8" dia M.S pipe (3 Nos) horizontally, 3/8" thick M.S sheet, 1½" x 1½" dia M.S pipe hand railing, including Fully welded joints, with no sharp edges, All the pipes are welded to each others, inclusive of approved shade of spray paint work after applying anti rust paint. Includes mild steel base plates, cover plates, dash fasteners, welding, and fixing to staircases/balconies, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by the Architect.			
	Staircase	25.2 Rft		
	Balcony	18 Rft		
	Control room and Watch towers	76.5 Rft		

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S.N O	DESCRIPTION	QUANTI TY		
28	JANITORIAL CABINET			
	Provide and install Janitor Space consisting of 3/4" thick pre polished Marble shelves with bull-nose rounded edges lay on 1½ x 1½ M.S angle for support including 3/4" thick lamination board shutter fixed with spring hinges including 6" wide & 3/4" thick flamed marble over 4" thick block masonry ledge all hardware, anti rust paint and spray paint, wastage, etc. Complete in all respect as shown in drawing and as directed by the Architect.	36 Sft		
29	PANTRY BASE CABINET			
	Providing, making and install wooden base cabinet consisting of 3/4" thick pre-polished granite top having demi-bullnose edges, place with marble jelly over 2" thick precast RCC slab, including the cutting of bowl for under counter sink, along with 3/4" thick laminated board cabinet Shutter, shelf with matching PVC lipping, S.S handle, S.S hinges, locks key set, magnetic catchers including all necessary hardware and material, wastages etc. Complete in all respect as shown on drawing and as directed by the Architect. Use lamination by Al-Noor or Patex	51 Sft		
30	PANTRY HANGING CABINET			
	Providing and making Wooden cabinet consisting of 3/4" thick laminated board Shutters, shelves including matching PVC lipping, S.S handle, hinges, locks, catchers all necessary hardware and material, wastages etc. Complete in all respect	40 Sft		

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	as shown on drawing and as directed by the Architect. Use lamination by Al-Noor or Patex.			
31	FILLING CABINET			
	Providing and making base and hanging Wooden filling cabinet consisting of 3/4" thick laminated board Shutters, shelves and lamination top including matching PVC lipping, S.S handle, hinges, locks, catchers all necessary hardware and material, wastages etc. Complete in all respect as shown on drawing and as directed by the Architect. Use lamination by Al-Noor or Patex.	245 Sft		
32	FIXED AND SLIDING ALUMINUM WINDOWS			
	Provide, fabrication & installation in position Aluminum fixed and sliding window consisting of 6mm + 12mm air space + 6mm clear glass, with machine polish edge finish, fly mesh shutter, safety films with approved Aluminum section, natural anodized finish with all other hardware's, gasket, silicone sealant, wastage, schedule etc., complete in all respect as per drawing and related detail and as directed by the Architect. Use Aluminum section from Pak. cables, Chawla, Prime Aluminum or approved equivalent	1335 Sft		
33	BULLET-RESISTANT GLASS			
	Supply and installation of 32mm thick laminated bullet-resistant glass, certified to UL 752 Level 2 (stoppage of 357 Magnum), consisting of alternating layers of tempered glass and polycarbonate bonded with PVB interlayers.	20 Sft		

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	Includes polished edges, UV protection, and 85% light transmission, complete in all respect as per drawing and related detail and as directed by the Architect.			

S.N O	DESCRIPTION	QUANTITY		
34	LOOKING MIRROR			
	Provide and install 6mm thick looking mirror (Imported) pasted with approved quality of double tape over 1/8" thick commercial ply including 1/8" thick stainless-steel U shape channel at the top and bottom of mirror which will be screw on plastered surface wall, cutting, lifting, shifting, wastages etc. Complete in all respect as shown in drawing and as directed by the Architect.	45 Sft		
35	FROSTED FILMS			
	Provide and apply self-adhesive Computerized Printed Frosted film 100 microns as per design from outside, with cutting, wastage, etc. complete in all respect as shown on drawing and as directed by the Architect.	1285 Sft		
36	SAFETY FILMS			
	Provide and apply self-adhesive safety film 100 microns as approved as per design from inside, with cutting, wastage, etc. complete in all respect as shown on drawing and as directed by the Architect.	1285 Sft		
37	WOODEN PELMET			

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	Provide, make and fix wooden pelmet consisting of 1/2" thick x 4" width MDF board including the cost of approved shade of paint work with all necessary hardware and material, cutting, lifting, glue, nails, scaffolding and wastages etc. Complete in all respect as shown in drawing and as directed by the Architect. Use MDF : ZRK / Malaysian or approved equivalent.	205 Rft		
38	ROLL-UP BLINDS			
	Provide and install window perforated / black out roll-up blinds of approved quality and make with wastage etc. complete in all respect as per manufacture specification and as directed by the Architect. SOURCE: The Protector or approved equivalent.	1365 Sft		
39	RECEPTION COUNTER			
	Provide, make and install in position 22'-0" X 3'-0" X 8'-6" high reception counter consisting of approved quality sample of block masonry for structure/supporting walls using 6" thick solid blocks, with a compressive strength, and also including the cost of pre-cast slab for top, Plaster finish, 3/4" thick pre-polished granite on top and facia, 12 mm thick clear tempered float glass with edge polishing and chamfering, 2- 1/2" dia S.S pipes supports brush finish, 2"x4"x18 swg and 4"x4" in size mdf board beam for display and teak ply polish finish light pelmet, teak wood polish finish strip ceiling, internal base cabinets, mobile unit, shelves cutting, lifting, wastages etc. Complete in all respects as shown in drawings and as directed by the Architect.	1 Job		

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S.N O	DESCRIPTION	QUANTI TY		
40	PAINT WORKS			
	Providing and applying approved shade of paint minimum three coats over concrete or plastered surfaces with all required filling, using sand paper for rubbing to make smooth finish at any level & height including minimum two coats of primer sealer from "JOTUN / KANSAI" to be applied as per Architects guidelines along with both the primer coats in thin layers just to fill the voids / pin holes and achieve smooth surfaces with first paint coat to be applied using white color and rest of the coats in approved shade of paint to concrete / wall surfaces, grooves, jambs, sills and all coved junctions having all equipment such as: roller brush, tray, polythene sheet or waste paper to cover floor and other space, masking tape, scaffolding and wastages etc. Complete in all respects as directed by the Architects.	29205 Sft		
41	CEMENT CONCRETE SCREED AT ROOF			
	Providing and installation of Cement Concrete 1:3:3 (1 cement, 3 screened sand, 3 crush) screed in required slope, minimum 2" thick to 3" thick including curing, making ridges, valleys, champhered edges, hacking of existing surface for bonding where necessary, etc. complete in all respect as directed by the Architect.	4600 Sft		
42	ROOF CORNER GOLA			

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	Providing and installation of Corner gola 1:3:3 (1 cement, 3 sand, 3 crush) Gola in required slope, minimum 4" thick to 5" thick including curing, making ridges, valleys, champhered edges, hacking of existing surface for bonding where necessary, etc. complete in all respects as shown on the drawing and directed by the Architect.	245 Sft		
43	M.S GRILLS			
	Providing and fixing M.S. Grill of approved design/pattern made with M.S flat 1"x1/8" & 3/8" M.S bars/rods placed at 100mm to 125mm center-to-center (C/C), securely welded to an outer frame of 3/4" x 3/4" M.S. Angle or Flat. The work includes painting with one coat of red oxide primer and two or more coats of enamel paint of approved shade/color, including fixing with holdfasts to masonry/concrete, at all heights/floors, and complete in all respects as shown on the drawing and directed by the Architect.	1385 Sft		
44	ROLLING SHUTTER			
	Providing and Fixing 1/2" dia bars grill rolling shutter, consisting of steel frame of M.S channel 2"x11/4"x1/8" (50x30x3mm) angle iron 11/2"x11/2"x1/8" (40x40x3mm) M.S plate 1"x1"x1/8" (300x300x3mm) GI pipe 11/2" (37mm) dia, spring 2' (600mm) center to center, rollers 24 SWG GI covering 1'x1' (300mm),	125 Sft		

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	handles, holdfast interlocked, with top cover, side guides, heavy-duty springs, and locking system, including, transportation, painting, and installation as per manufacturer specifications and complete in all respects as shown on the drawing and directed by the Architect.			
45	ROOF INSULATION			
	Providing and fixing 50 mm thick Jambool insulation with a density and thermal conductivity on roof. With all necessary hardware and material, cutting, lifting, and wastages etc Complete in all respects as shown on the drawing and directed by the Architect.	2445 Sft		

S.N O	DESCRIPTION	QUANTI TY		
46	M.S FENCING			
	Providing, Fixing and installation of fencing specification, description and detail same as existing fencing, transportation, painting, and installation as per manufacturer specifications and complete in all respects as shown on the drawing and directed by the Architect. contractor must visit and review detail of existing fence.	535 Rft		
47	OPERATION AND EXIT CABIN			
	Supply and installation of a pre-fabricated Portable Fiberglass Reinforced Plastic Cabin, manufactured with high-quality, weather-resistant materials, complete with structural,, cutting, lifting, all fixing arrangements, wastage,	2 Nos		

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	and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.			
48	M. CYCLE LANE CANOPY			
	Provide and fix in a position of canopy consisting of 3/4" thick cement board sheet screwed to 4"x2" metal framework, 4"x4" vertical posts between 10' center to center gaps, including cost of base plate, rawal bolts, rawal plugs with all requirements, including the cost of three coats of Matt Enamel paint finish, making grooves at sheet joints (where required), cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	175 Sft		
49	DRIVERS WAITING AREA CANOPY			
	Provide and fix in a position of canopy consisting of fiberglass sheet screwed to 4" x 2" metal framework, 4"x4" vertical posts between 10' center to center gaps, including cost of base plate, rawal bolts, rawal plugs with all requirements, including the cost of three coats of Matt Enamel paint finish, making grooves at sheet joints (where required), cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	125 Sft		
50	HEAD OFFICE MAIN GATE			
	Removing and refixing of MS gate with any damages part servicing, shifting, painting, and installation as per manufacturer specifications	1 Job		

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	and complete in all respects as shown on the drawing and directed by the Architect.			
51	RUGS FOR TANKS			
	Provide and fixing 1½" dia. 14 SWG stainless steel pipes rungs embedded into tank walls (where required), between 12" c/c gaps, cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	15 Nos		
52	THERMOPLASTIC PAINT			
	Providing and laying of hot applied thermoplastic paint of 2.5 mm thickness x 4-inch width (Road & Parking Lanes in yellow & white color) of uniform finish with thermoplastic paint with machine in white/yellow color and super imposed with reflect rising glass beads including cleaning the surface of all dirt, seals, oils, grease and foreign material and spraying of reflect rising glass beads @ 250 gm/sqm, guarding, barricading, etc. Complete in all respect specifications directed by the Architect.	2075 Rft		

S.N O	DESCRIPTION	QUANTI TY		
53	STAINLESS STEEL RAIL			
	Providing, fabricating, and fixing Stainless Steel pipe fence/railing, 2-inch outer diameter pipe for top/bottom rails and posts, Grade 304 (as required). Including welding, grinding, polishing to a mirror/matt finish, fixing with concealed stainless-steel base plates and anchor bolts to			

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	concrete surface/core drilling, and cleaning upon completion. Height of fence 2-feet above ground level cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect. Size: approx. 3' - 6 " length each.	15 Nos		
54	MS MAIN GATES			
	Providing, fabricating and installation Gates consisting of 6"x4"x1/4" main MS tube frame that will be welded for the gate and MS sheet 14 swg, there will be vertical ribs metal hollow pipes of 1½" x 1½" thick 16swg welded to main frame over MS sheet 14 swg spray paint finish, latch inside box section, SS Studs, 2" dia MS pipe handle (approved), tower bolts & etc. and also including 2 nos vertical 6"x4" MS Shaf spray paint finish welded to main frame outer faces of gates. All the pipes are welded to each others inclusive of approved shade of spray paint work after applying anti rust paint, cutting, lifting, shifting, scaffolding, all hardware and material use for fabrication and wastages etc. Complete in all respect as shown in drawing and as directed by the Architect.			
54.1	Gate size: 20'-6" x 10'-0"	2 Nos		
54.2	Gate size: 9'-6" x 10'-0"	1 Nos		
54.3	Gate size: 4'-6" x 10'-0"	2 Nos		
54.4	Gate size: 3'-9" x 10'-0"	1 Nos		
55	PAVEMENT QUALITY CONCRETE			
	Providing and laying Pavement Quality Concrete (PQC) of specified grade (M40/M50), using slip-form or fixed-form pavers, including surface finishing, curing, making, champhered edges, hacking of existing surface for bonding where	975 Sft		

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	necessary, etc. complete in all respects as shown on the drawing and directed by the Architect.			
56	LANDSCAPE			
	TREES REMOVING AND RESHIFTING			
	Removing and resifting of trees, shifting and installation as per decided locations and complete in all respects as shown on the drawing and directed by the Architect.			
56.1	Trees 5'-15' (Shifting)	20 Nos		
56.2	Trees 16'-20' (Cutting)	20 Nos		

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Allied Works at Malir, Karachi

HVAC

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ALLIED WORKS AT MALIR, KARACHI
HVAC BOQ

S.No	Description	Qty.			
1	2	3		4	5
Air-Conditioning Single Split System					
1	Supply, Installation,,Testing & Commissioning of Inverter base Cool & Heat type mini split type A/C units (T-3 Series) complete with ACRA-CLAD factory coated condenser fins, atmosphere friendly refrigerant etc. Complete with safety controls and accessories as per specification and drawings.				
i	Wall Mounted (Capacity 2.0 TR)	11	Nos.		
ii	Wall Mounted (Capacity 1 TR)	2	Nos.		
2	Supply, Installation, Testing & Commissioning of Copper Piping with Isolation valve & 3/4" thick foam insulation, cladding, pipe supports & pipe sleeves complete with all respects as per drawings & specification.				
ii	2.0 TR	650	Rft.		
iv	1.0 TR	100	Rft.		
3	Supply, installation, testing & commissioning of Ventilation & Exhaust fan with fitting, vibration isolator, Flexible connection & supports etc. as per specification and drawings.				
i	Exhaust Air Fan 180 cfm @ 0.5" ESP	1	No.		
ii	Decorative type Propeller Fan with automatic lower (100 cfm)	6	Nos.		
4	Supply & Installation of Air Devices with damper (Tuttle & Bailey standards) Complete with all respect as per specification and drawings.				
a.	Exhaust Air Grill				
i.	6" dia E.A.R	2	Nos.		
i.	9" dia E.A.R	3	Nos.		
b.	Exhaust Air Louvers				
i.	12" x 10" E.I.L	1	No.		
i.	12" x 8" E.I.L	1	No.		
i.	10" x 8" E.I.L	1	No.		
5	Supply, Installation, Testing & Commissioning of Low pressure G.I. Sheet Metal ducting (Machine Made) as per SMACNA & ASHRAE Standards for air ducting, plenums and other sheet fabrications including splitter dampers, take				

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HVAC BOQ

	off, vanes elbows and other necessary fittings with galvanized hanger supports as per specification and drawings.				
i	24 Gauge	250	Sq.ft.		
6	Supply & Installation of UPVC Class-D Piping for equipment drain complete with Specialties, 0.5" thick closed cell foam insulation, wall, floor etc. core cutting, cladding complete with fitting & hanger supports etc. as per specification and drawings.				
i	1-1/2" dia (3/4" Insulation)	65	Rft.		
ii	1-1/4" dia (3/4" Insulation)	40	Rft.		
iii	1" dia (3/4" Insulation)	80	Rft.		
iv	3/4" dia (1/2" Insulation)	90	Rft.		

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HVAC BOQ

S.No	Description	Qty.			
1	2	3		4	5
7	Air Curtain (6'-0") Supply, installation, testing, and commissioning of a 6'-foot-long decorative air curtain with an air velocity of 2000 Feet Per Minute (FPM), complete with all necessary accessories including a disconnect switch, in accordance with the specifications and approved drawings.	2	Nos.		
8	Supply & Installation of Complete Electric power (from electric point to indoor as shown in drawing) & control wiring complete with PVC conduit & hanger supports etc. for Equipment as per Specification and drawings.	1	Lot		
9	Additional system atmosphere friendly refrigerant charge as per site requirement Complete with all respect as per specification and drawings.	1	Lot		
10	Equipment foundation and equipment shifting charges from Ground floor to foundation pads as per specification and drawings.	1	Job.		
11	Supply & Installation of 3" dia core cutting complete with all respect.	6	Nos		
12	Cost of testing, starting up, commissioning, balancing, adjusting and handling over of the complete Plant.	1	Job.		
GRAND TOTAL (RS)					

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Allied Works at Malir, Karachi

Plumbing

PSPC N-1 GATE

ALLIED WORKS AT MALIR, KARACHI

Plumbing BOQ

S.No	Description	Qty.		
1	2	3	4	5
PART- A INTERNAL PLUMBING SYSTEM				
1	Supply, installing, testing and commissioning of electric operated hot water geyser (storage type) of approved make and capacity as specified, comprising corrosion-resistant inner tank, imported thermostat, heating element, safety valve, insulation, mounting accessories, and all necessary fittings, suitable for working pressure up to 60 PSI, complete in all respects, in accordance with drawings, specifications.			
i	15 Ltr	1	Nos.	
2	Supply & Installation of approved quality European type water closet (WC) with close coupled cistern, including all internal cistern fittings, flush mechanism, inlet/outlet connections, acrylic seat cover, fixing accessories, floor bolts, wax seal, and all necessary fittings, complete in all respects, in accordance with drawings, specifications. Approx. Size: Width: 14 - 16 inches x Depth: 28 - 30 inches x Seat Height: 15 - 17 inches	5	Nos.	
3	Supply & Installation of Eastern style water closet of approved make, complete with flushing cistern, internal cistern fittings, flush pipe, footrests, trap, necessary brackets, and all required accessories, including connection to soil pipe and water supply line, complete in all respects, in accordance with drawings. Approx. Size: L: 25 - 27 inches x W: 17 - 19 inches x H: 7 - 9 inches	6	Nos.	
4	Supply & Installation of Wash Basin Complete Set wash of approved make, size and color, complete with waste coupling, bottle trap, tee stop cocks (angle valves), necessary brackets, supports, CP connection pipes, and all required fittings and accessories, including connection to water supply and drainage system, complete in all respects,	7	Nos.	

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ALLIED WORKS AT MALIR, KARACHI

Plumbing BOQ

	in accordance with drawings, specifications, and instructions of the Engineer/Consultant				
5	Supply & Installation of single lever tap of approved make, chrome plated brass body, complete with cold water connections, flexible connection pipes, cartridges, necessary fittings, fixtures, and all required accessories, including testing and commissioning, complete in all respects, in accordance with drawings, specifications.	7	Nos.		
6	Supply & Installation of Towel Dispenser (SS body) complete with all respect.	7	Nos.		
7	Supply & Installation of WC Hand Operated Shower With double bib Valve complete with all respect.	7	Nos.		
8	Supply & Installation of Sanitizer -Automatic.	6	Nos.		
9	Supply & Installation of Toilet Roll Holder.	7	Nos.		
10	Supply & Installation of S.Steel Robe hooks.	6	Nos.		
11	Supply & Installation single compartment kitchen sink of approved make, stainless steel construction, complete with tap for the bowl, waste coupling with drain lever mechanism, tee stop cocks (angle valves), bottle trap/P-trap, CP connection pipes, necessary brackets, supports, and all required fittings and accessories, including connection to water supply and drainage system, testing and commissioning, complete in all respects, in accordance with drawings, specifications	1	No.		

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ALLIED WORKS AT MALIR, KARACHI

Plumbing BOQ

S.No	Description	Qty.			
1	2	3		4	5
12	Supply and installation of C.P Tee valves, for cistern water inlet CP connectors with nuts and fittings.	22	Nos.		
13	WATER DISTRIBUTION SYSTEM				
a.	Supply and installation of PPR PN 20 piping for <u>cold & Hot water system (hot water system only for pantry)</u> , with fittings, specialties, including all cutting, fitting, fixing and cleaning, wall and slab sleeves/Core Cutting, CP clamps, hangers and supports, making connection with fixtures, valves and specialties, chiseling, making wall a floor openings and making good, pressure testing at a pressure of 250 psi, painting of exposed piping in occupied areas with primer and coats of approved paint in approved color complete in all respect.				
i.	2" diameter	90	Rft.		
ii.	1 1/2" diameter	50	Rft.		
iii.	1 1/4" diameter	150	Rft.		
iv.	1" diameter	90	Rft.		
v.	3/4" diameter	80	Rft.		
vi.	1/2" diameter	300	Rft.		
b.	Gate Valve				
i.	1 1/2" diameter	2	Nos.		
ii.	1 1/4" diameter	2	Nos.		
iii.	1" diameter	4	Nos.		
14	SOIL, WASTE AND VENT SYSTEM				
a.	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for <u>soil, waste & vent</u> stacks and horizontal runs buried in ground or above false ceiling, in shafts exposed or concealed in floors and walls and connecting to manholes, including cutting, fitting, chiseling, wall and slab sleeves/Core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				
i.	4" diameter	480	Rft.		

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Plumbing BOQ

ii.	3" diameter	200	Rft.		
iii.	2" diameter	300	Rft.		
15	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for RAIN WATER including cutting, fitting, chiseling, wall and slab sleeves/Core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				
i.	4" dia	80	Rft.		
16	Supply and installation of Floor Drain with Trap complete in all respect.				
i	3" dia	14	Nos.		
17	Supply, installation, testing, and commissioning of vent cowl for sewerage piping system, with approved drawings, project specifications. Approved				
i.	3" dia	2	Nos.		
ii	4" dia	1	No.		

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Plumbing BOQ

S.No	Description	Qty.			
1	2	3		4	5
18	Supply and installation of Clean Out complete in all respect.				
ii.	4" dia	4	Nos.		
19	Stainless Steel Grease Trap for Kitchen Installed Below Sink on Floor (Size = 24" L x 18" W x 18" H)	1	No.		
TOTAL COST PART-A PLUMBING SYSTEM (Rs.)					
PART-B EXTERNAL PLUMBING SYSTEM					
1	Supply, Installation, testing & commissioning of centrifugal O.H. water Transfer pumps complete with Motor, Auto water filling control system and accessories as per drawings and specifications. (25gpm, 80ft. Head).	1	Nos.		
2	Supply & installation of R.C.C M.H with Heavy duty cover complete with all respect as per drawing & specification. (Local with Stanton cover)	5	Nos.		
3	Supply and installation of Rain water Chancel including heavy duty High-density polyethylene (HDPE) gratings as per specification & drawing.				
i.	18"X 18"	6	Nos.		
4	WATER DISTRIBUTION SYSTEM				
a.	Supply and installation of PPR PN 20 piping for Water, Irrigation system , with fittings, specialties, including all cutting, fitting, fixing and cleaning, wall and slab sleeves/Core Cutting, CP clamps, hangers and supports, making connection with fixtures, valves and specialties, chiseling, making wall an floor openings and making good, pressure testing at a pressure of 250 psi, painting of exposed piping in occupied areas with primer and coats of approved paint in approved color complete in all respect.				
i.	1 1/4" diameter	110	Rft.		
ii	1" diameter	320	Rft.		
a.	Gate Valve				
i	1 1/2" diameter	4	Nos.		
ii	1 1/4" diameter	2	Nos.		
iii.	1" diameter	2	Nos.		
b.	Float valve	1	Nos.		

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Plumbing BOQ

b.	Foot valve				
i	1 1/2" diameter	2	Nos.		
d	Strainer				
i	1 1/2" diameter	2	Nos.		
6	SOIL, STROM WATER SYSTEM				
a.	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for soil and Strom stacks and horizontal runs buried in ground or above false ceiling, in shafts exposed or concealed in floors and walls and connecting to manholes, including cutting, fitting, chiseling, wall and slab sleeves/Core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				
i.	6" diameter	580	Rft.		

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ALLIED WORKS AT MALIR, KARACHI

Plumbing BOQ

S.No	Description	Qty.			
1	2	3		4	5
7	Supply & Installation of Weatherproof MCC for Plumbing System with circuit Breakers, Disconnect switches, fuses, starters etc. for all equipment as per specification & drawing. (Isolation breakers shall be finalized as per manufacturer specifications.)	1	Nos		
8	Supply & Installation of Complete Electric power & control wiring complete with PVC conduit and power wiring will be in G.I Cable tray & hanger supports etc. for Equipment as per Specification and drawings.	1	Job		
9	Excavation and back filling for the Strom,sewerage and plumbing pipes as per drawings and specifications.	1	Lot.		
TOTAL COST PART-B PLUMBING SYSTEM (Rs.)					
PART-C EXISTING WATER PUMP SHIFTING					
1	Supply, installation, testing, and commissioning of HDPE piping complete with all necessary fittings and specialties, including cutting, jointing, fixing, and cleaning. The scope shall include provision of wall and slab sleeves/core cutting, CP clamps, hangers, and supports; connections to fixtures, valves, and associated specialties; chiseling and formation of wall and floor openings; and making good to original finishes after installation. All piping shall be pressure tested at 250 psi to ensure system integrity. The work shall be completed in all respects in accordance with project specifications and approved drawings.				
a.	3" diameter	840	Rft		
b.	2" diameter	270	Rft		
2	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for Tanker Water stacks and horizontal runs buried in ground, including cutting, fitting, wall core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				
a.	3" diameter	72	Rft		

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Plumbing BOQ

3	Dismantling and re installation of existing water supply pump with Equipment foundation and equipment shifting charges as per drawings and specifications.	1	Lot		
4	Excavation for water supply pipelines including road cutting, dressing of trench bottom, backfilling with approved material in layers with proper compaction, disposal of surplus material, and reinstatement of road and surrounding surfaces to original condition, complete as per drawings and specifications.	1	Job		
5	Supply & Installation of Weatherproof MCC for Plumbing System with circuit Breakers, Disconnect switches, fuses, starters etc. for all equipment as per specification & drawing. (Isolation breakers shall be finalized as per manufacturer specifications.)	1	Nos		
6	Supply & Installation of Complete Electric power & control wiring complete with PVC conduit and power wiring will be in G.I.Cable tray & hanger supports etc. for Equipment as per Specification and drawings.	1	Job		
7	Supply and Installation of valve chamber with 3" dia isolation valve for external water supply system for water supply complete in all respect.	2	Nos		



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ALLIED WORKS AT MALIR, KARACHI

Plumbing BOQ

S.No	Description	Qty.			
1	2	3		4	5
TOTAL COST PART-C PLUMBING SYSTEM (Rs.)					
PART-D GENERAL WORKS					
1	Cost of testing, starting up, commissioning, balancing, adjusting and handling over of the complete system.	1	job.		

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Allied Works at Malir, Karachi

Electrical & Security Equipment's

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ALLIED WORKS AT MALIR, KARACHI
Reception Building Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
	GENERAL NOTES:				
1	Quantities shown in BOQ are tentative, contractor should verify all quantities as per drawings and deliver at site as per actual quantity.				
2	All material should be procure from authorized vendor /supplier.				
3	Rate should be quoted based on the specified material/supplier as mentioned in approved material list.				
4	Any material which is procured without consultant approval is not acceptable and should be removed at their own cost by the contractor.				
5	This is the responsibility of electrical contractor to prepare coordinated shop drawings submitted to consultant for review and approval before execution of works at site.				
6	This is the responsibility of contractor to coordinate with other services at site.				
1.0	LV POWER CABLES Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required, clipped to surface with cleats or on previously installed cable tray/ trunking or raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect.				
1.1	4C-50 Sqmm Cu/PVC/PVC Cable +1C-25 Sq.mm Cu/ PVC Cable as a ECC. (Main Incoming Cable to MDB)	150	R.ft		
1.2	4C-35 Sqmm Cu/PVC/PVC Cable +1C-16 Sq.mm Cu/ PVC Cable as a ECC.	50	R.ft		
1.3	4C-16 Sqmm Cu/PVC/PVC Cable+1C-10 Sq.mm Cu/ PVC Cable as a ECC. (Main Incoming Cable to DB-G)	50	R.ft		
1.4	4C-16 Sqmm Cu/PVC/PVC Cable+1C-10 Sq.mm Cu/ PVC Cable as a ECC.(Main Incoming Cable to DB-F)	50	R.ft		
2.0	LV MAIN /SUB MAIN DISTRIBUTION BOARD				
	Supply & Installation, connection, testing & commissioning of following mixed capacity MCCB / MCB / Magnetic Contractor / Relay etc. LV MDB /SMDB/DB's Surface / Flush Type, Floor / Wall with 16 SWG Sheet steel housing with approved color code, complete with all mounting accessories as per Single Line drawings and specifications, complete in all respect.				
2.1	MDB-1	1	No.		

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2.2	DB-GF	1	No.		
2.3	DB-FF	1	No.		
3.0	INTERNAL WIRING				
3.1	POINT WIRING				
	Supply, installation, Testing, commissioning and connection of Point Wiring for light Fixture and Fan with 3 x 1c x1.5 Sq.mm PVC insulated copper wire in 25mm dia. PVC conduit surface/ concealed mounted including all required mounting and installation accessories, etc., complete in all respects.				
a)	From Light controlled switch to 1st Light fixture.	50	No.		
b)	Point wiring b/w light fixture to light fixture	50	No.		
c)	Exhaust Fan Point.	8	No.		
d)	Ceiling Fan point	16	No.		

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Reception Building Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
3.2	CIRCUIT WIRING				
a)	Supply, installation, testing, commissioning, and connection of circuit wiring from the Distribution Board (DB) to the lighting control first switchboard and from first to other switchboards, using 3 × 1C × 2.5 sq.mm single-core PVC insulated copper conductors drawn in 25 mm diameter PVC conduit, including all necessary installation and mounting accessories, complete in all respects as per approved drawings and specifications.	15	No.		
b)	Supply installation and connection of Wiring for 13A, Multi Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	25	No.		
c)	Same as item no b) but point to point wiring.	10	No.		
d)	Supply installation and connection of Wiring for 13A, Flat Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (UPS circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
e)	Same as item no d) but point to point wiring.	5	No.		
f)	Supply installation and connection of Wiring for 15A, Multi Pin/Flat pin switch socket outlets from DB to first outlet point with 3x1C-4mm ² PVC insulated copper wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW/UPS circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
g)	Supply, Installation & Wiring of 1.0/1.5 TR split AC from DB to respective indoor isolator/socket and from indoor to outdoor isolator with 3x1C-4mm ² PVC cable in 25mm dia PVC conduit complete with all required installation and mounting accessories complete in all respects per drawing and specification.	10	No.		
g)	Supply, Installation & Wiring of 2.0/2.5 TR split AC from DB to respective indoor isolator/socket and from indoor to outdoor isolator with 3x1C-6mm ² PVC cable in 25mm dia PVC conduit	10	No.		

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	complete with all required installation and mounting accessories complete in all respects per drawing and specification.				
4.0	RACEWAY & BOXES for ELECTRICAL SYSTEMS				
	Supply and installation of following sizes PVC conduit with all required installation accessories like tee, bend, etc., for sub-main cables on concealed / surface, complete in all respect as per drawing & specification. Complete in all respect.				
4.1	25 mm dia. PVC conduit	1000	R.ft		
4.2	50 mm dia. uPVC Class 'D' conduit	150	R.ft		
4.3	100 mm dia. uPVC Class 'D' conduit	150	R.ft		
4.4	Supply & installation of 16 SWG sheet steel with powder coated Floor Type technologic boxes to accommodate following devices: 1 No. 13A, Multi-Pin(Simplex) switch socket outlet. 1 No. 13A, Flat-Pin(Duplex) switch socket outlet. 1 No. 2 x RJ 45 device plate outlet for data and voice outlet complete in all respect.	5	No.		

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Reception Building Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
4.5	Supply & installation of 16 SWG sheet steel with powder coated type-A technologic box to accommodate following devices: 1No. 13A, Multi Pin switch socket outlet.(Simplex) 1No. 13A, Flat Pin switch socket outlet.(Duplex) 1 No. 1x RJ45 device plate outlet for data. 1 No.1x RJ11 device plate outlet for data. complete in all respect.	10	No.		
4.6	Supply & installation of 16 SWG galvanized sheet steel powder coated type-B technologic box to accommodate following devices: 1No. 13A, Multi Pin switch socket outlet.(Simplex) 1No. 13A, Flat Pin switch socket outlet.(Duplex) 1 No. 2x RJ45 device plate outlet for data. 1 No. 2x RJ11 device plate outlet for data. complete in all respect.	10	No.		
4.7	Back Box: Supply and installation of 16 SWG sheet steel powder coated back box with brass earth terminal, complete in all respect.	150	No.		
5.0	SWITCHES & SOCKET OUTLET				
	Supply & Installation of following type switches / sockets as per design drawings & specification, complete in all respect.				
5.1	10A,One gang switch unit.	1	No.		
5.2	10A, Two gang switch unit.	6	No.		
5.3	10A,Three gang switch unit.	7	No.		
5.4	10A, Four gang switch unit.	10	No.		
5.5	13A, Multi Pin switch socket unit.(Simplex).	50	No.		
5.6	15A, Multi Pin switch socket unit.(Simplex).	3	No.		
5.7	13A flat pin switch socket unit.(duplex)	10	No.		
6.0	INTERIOR LIGHTING				
	Supply Installation, Termination and Commission of following lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, electronic ballast, connector (Porcelain), supports, hanging & fixing materials(Such as Steel Rod/Chain), etc. including all mounting and installation accessories. Complete in all respects.				

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6.1	Linear LED Light Fixture, (Hanging Type), 40watt (4000K)	15	No.		
6.2	LED Downlight, light fixture (Recessed Type), 16 watt (4000K)	65	No.		
6.3	LED Downlight, light fixture (Recessed Type), 7 watt (4000K)	5	No.		
6.4	LED Downlight, light fixture (Surface Type), 16 watt (4000K)	25	No.		
6.5	LED Downlight light fixture (Recessed Type), 7 watt (4000K)	15	No.		
6.6	LED Downlight fixture (Recessed Type), 1x18W (4000K)	10	No.		
6.7	Mirror light fixture, Wall mounted type, 7watt, (4000K)	5	No.		

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Item No	Description of Items	Qty.	Unit		
7.0	ESCAPE ROUTE LIGHTING				
	Supply Installation, Testing and Commission of the following Emergency lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, 3 Hour Back up battery, connector (Porcelain), supports, hanging & fixing materials (Such as Steel Rod/Chain), etc. including all required mounting and installation accessories. Complete in all respects.				
7.1	LED Emergency light fixture, Wall Mounted, 8 watt lamp self maintained type.	8	Nos.		
7.2	LED Emergency light 3 watt lamp non maintained type.	20	Nos.		
7.3	LED Emergency light Fixture, 8 watt lamp with Directional Pictogram	8	Nos.		
8.0	FAN, EXHAUST FAN & HAND DRYER				
	Supply, installation and connection of following size of Ceiling fan, with all fixing accessories.				
a)	Ceiling Fan 56"	12	No.		
b)	Ceiling Fan 48"	6	No.		
c)	12 inch dia. sizes of wall / glass mounted exhaust fan, with louvers	8	No.		
8.1	HAND DRYER				
	Supply Installation, Testing and Commission of Hand dryer of approved brand. including all required mounting and installation accessories. Complete in all respects.	3	No.		
9.0	STRUCTURED CABLING				
	Supply, installation, testing & commissioning of following items for data/voice communication system including all material, labor, tools, installation accessories. Complete in all respects. Quantities for cables shown in BOQ are estimated and taken from drawings. Contractor is advised to take measurement at site before commencement of works.				
9.1	Simplex Face plate with RJ-45 UTP CAT-6 I/O for Data including shutter, complete in all respect	10	Nos.		
9.2	Duplex Face plate with 2 Nos I/Os RJ-45 UTP CAT-6 for Data/Voice, including shutters, complete in all respect	20	Nos.		
9.3	Supply, installation of 4 pair CAT-6 UTP cables for data system from rack to each workstation in already laid 25mm dia PVC conduit. Complete in all respects.	4000	R.ft		

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9.4	Supply and installation of 25mm dia PVC conduit with all accessories like lindapters etc., for above cables on concealed / surface, complete in all respect as per drawing & specification.	1000	Mtrs.		
9.5	Supply and Installation of Following CAT-6 Patch Panels for data Communication system including all mounting accessories. Complete in all respects.				
9.6	24-port UTP CAT-6 patch panel with I/O for data	3	Nos.		
9.7	Front / Rear Cable Organizer.	3	Job		
9.8	3 feet long CAT-6 patch cord with RJ-45 connectors at both ends for voice.	25	Nos.		
9.9	9 feet long CAT-6 drop cord with RJ-45 connectors at both ends for voice.	25	Nos.		
9.10	Supply and Installation of 4 core multi mode 9/125um fiber cable connected as back bone between MDF and BAT	500	R.ft		
9.11	Supply, installation and connection of HDMI cables (15 Meter)including all accessories as per specifications and drawings.	2	No.		

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Item No	Description of Items	Qty.	Unit		
9.12	Supply, installation and connection of VGA cables (15Meter) including all accessories as per specifications and drawings.	2	No.		
9.13	Supply and Installation of 19U, 33" wall mounted rack, 600mm(W) x 600mm(D), with 4 imported power socket panel and 1 No. exhaust fan	1	No.		
9.14	Testing, Commissioning, proper tagging, Fluke Testing & Submission of Fluke Report along with 20 year warranty certificate from principal of brand for complete DATA Communication System by authorized local representative of the manufacturer.	1	Job.		
9.15	Supply, installing, Testing & Commissioning of following multi pair telephone cable in already laid appropriate size of PVC conduit complete in all respects.				
a)	25 pair Cable	400	R.ft		
10.0	VIDEO SURVEILLANCE SYSTEM				
	Supply, Installation of 5 MP 1/3" color low light TM enhanced sensitivity PAL digital color view HD CMOS camera (IP base) Onvif support, H.265, MPEG-4 & MJPEG compression, Day/Night Performance, operating on PoE / 24VAC power input including 3 -9mm varifocal Auto Iris lens, with password protection and required metal mounting bracket with all required installation accessories, as per specifications. complete in all respect.				
10.1	Fixed Type Camera	10	Nos		
10.2	Dome Type Camera	5	Nos		
10.3	Supply, installation, testing, and commissioning of 4 MP indoor Facial Recognition Camera dome type with varifocal lens (6-22 mm), AI analytics, True WDR, IR range 30 m, H.265 video compression, PoE, IK10 & IP67 protection, including power adapter, junction box, and mounting bracket. Complete with all power/control cabling, installation, and commissioning as per approved drawings, specifications or as directed by the Engineer/Consultant.	4	Nos		
10.4	Supply, installation and connection of 4 pair CAT-VI cable for CCTV camera. In already laid 25mm dia. PVC conduit or via cable tray including all required installation and mounting accessories as per specifications and drawings. Complete in all respect.	3000	R.ft		

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10.5	Supply and installation of 25mm dia PVC conduit with all required installation and mounting accessories for above cables on concealed / surface, complete in all respect as per drawing & specification.	1000	R.ft		
10.6	Supply and installation of Junction Box 12" x 8" x 4" with cover plate, concealed / surface mounted, fabricated from 16 SWG sheet steel, powder coated complete with all fixing arrangements and accessories, complete in all respect.	1	No		
10.7	Testing, Commissioning and proper tagging of CCTV System by authorized local representative of the manufacturer with Licensing the Client Based Software for playback and video retrieval, including individual cameras licensing complete in all respect as per Vendor's Recommendation/ System requirement.	1	Job		

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Item No	Description of Items	Qty.	Unit		
11.0	FIRE DETECTION AND ALARM SYSTEM				
11.1	Supply ,Installation Testing & commissioning of Addressable type fire alarm Control Panel (FACP). shall have alarm facilities, hooter, fire / fault indicators, audio video signals, battery, battery charger, central processing unit, network integrator module, power supply, and also for detector actuated alarms, etc., Panel Should have SMS Module to generate alert message to at least 5 Persons, complete in all respects as per drawing & specifications.	1	No.		
11.2	Supply & Installation of Addressable optical smoke detector with base as per drawing & specifications.	11	No.		
11.3	Supply & installation of Addressable Heat detector with base as per drawing & specifications.	1	No.		
11.4	Supply and Installation of Electronic Sounder with flasher as per drawing & specifications.	3	No.		
11.5	Supply and Installation of Electronic Sounder as per drawing & specifications.	5	No.		
11.6	Supply and Installation of Manual Call Point as per drawing & specifications.	5	No.		
11.7	Supply and installation of wiring of Fire Alarm System devices with 1.5 Sq.mm two core shielded Fire resistant/retardant PVC/PVC cable(min 60 minutes) in 1" dia. M.S conduit in loops (ring circuits) from FACP surface run conduits to be M.S. 16 SWG anticorrosive red painted conduits with required installation and mounting accessories, complete in all respects as per drawings and specifications.	1000	R.ft		
11.8	Supply and installation of Fire alarm Junction box 12" x 8" x 4" with cover plate, concealed / surface mounted fabricated from 16 SWG sheet steel, powder coated, complete with all fixing arrangements and accessories, complete in all respect.	1	No.		
11.9	Testing, Commissioning and proper tagging of FA System by authorized local representative of the manufacturer.	1	Job.		
12.0	WALKTHROUGH GATE(WTG) : Supply, Installation, testing and commissioning of Dual Sensor Walk Through Gate (Metal & Cell Phone Detector) For Metals Detection of all metal weapons, including light alloys threats, High Throughput,Multi zone red signaling For Cell Phone: Detection of standard and miniaturized cell phones and smartphones, Detection of magnetized items,Multi zone yellow signaling with all required installation and mounting	2	Nos.		



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	accessories, Control Cables, power Cables, Conduit etc. etc. complete in all respect.				

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Bill of Quantities

Item No	Description of Items	Qty.	Unit		
13.0	GLASS FLAPPED SPEED GATE (GFSG) Supply, Installation, testing and commissioning of GFSG, complete with Cabinet AISI 304-Grade stainless steel main body and lateral lids, Top Cover & Flaps: Tempered Glass, Control: Motor start and stop control is maintained by control card, lower power consumption and silent running senses forbidden and reverse direction passing, all the obstacles in the passage are sensed with photoelectric sensor, Operational temp range - 15 C and +65 C 95% non-condensing humidity with all required installation and mounting accessories like control cables, power cables, conduits etc. etc. complete in all respect, Cabinet: Main body and lateral lids are AISI 304-grade stainless steel, Turnstile is equipped with an alarm system which senses forbidden and reverse direction passing, should have built in Control Card, Turnstiles closes flaps by itself after adjusted time if a valid card is presented but person not passed, compatible with all Access Control Systems, 200W of Power Consumption with 1 Amper Fuse, in case of Power Failure it must open in 2 directions, Between -15 °C and +65 °C, 95% non-condensing humidity; 220 V +/- 10%, mono phase, 50-60 Hz should work in Environmental and Power conditions, UPS (optional), logo can be printed on the flaps, sound signaling device. Must be Certified with following:- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1 Should have EU, EC and EN Certification with all required installation and mounting accessories like control cables, power cables, conduits etc. etc. complete in all respect.	2	Nos.		
14.0	Supply, Installation, testing and commissioning of Access Control Card Reader Device compatible with Door Controller, can be used for Outdoor Installation, Rated with IP65, 3-color High illuminated LED, can support DESFire, MiFare, EV1, EV2 and EM Cards, can communicate with Wiegand and RS-485 enabled. should have GDPR compliance, and compliance with ISO 9001/14001	4	Nos		
15.0	Door Controller:				

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	Supply, installation, testing and commissioning of Door Access Controller, capable of controlling the opening and closing of four doors simultaneously, complete with 4 Wiegand reader inputs, 4 lock interfaces, and 8 zone monitoring inputs. The controller shall include built-in LED status indicators for door status, buzzer alarm for entry/exit notification, detachable terminal blocks, and built-in battery backup. The system shall support OSDP (Open Supervised Device Protocol) for secure communication with peripheral devices and integration with the Security Management System, with schedule capacity of minimum 1024, event log storage up to 50,000 records, and user capacity up to 50,000 users. The controller shall include zone alarm monitoring, at least one monitored bell/siren output port, and operate on a 32-bit RISC processor (ARM Cortex-M3 core) with 10/100 Mbps Ethernet interface with auto-detection and minimum 8 MB serial flash memory. The controller shall be suitable for operation in environmental conditions of -20°C to +60°C and up to 90% non-condensing humidity. The device shall comply with GDPR requirements and certified with KC, CE, FCC, RoHS, and manufactured under ISO 9001 / ISO 14001 standards. Complete with all accessories, mounting, configuration, testing and commissioning as per approved drawings, specifications, and as directed by the Engineer/Consultant.	2	Nos		

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ALLIED WORKS AT MALIR, KARACHI
Reception Building Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
16.0	EARTHING SYSTEM				
	Supply, installation and connecting Chemically Enhanced Earth using copper bonded rod filled with soil conditioning material with 10'ft deep boring and back fill, chemical to enhance conductivity. Complete with termination clamps, cable from earth rod/pipe to inspection pit etc. as shown in drawings and details complete in all respects as per specification.				
16.1	Supply, installation of 20 mm dia, 3000mm long threaded copper bonded earth rod including Cable Clamp (type G), Complete in all respects.	2	Nos.		
16.2	Supply & installation of inspection pit with grey polymer lid as per drawing & specification.	2	Nos.		
16.3	Supply, installation and connection of the following PVC insulated/Bare Cu earthing conductors in conduit/directly buried as per drawings and specifications.				
16.4	From Equipment Body to ECP 1C-35 mm ² PVC cables (Green)	200	R.ft		
16.5	From Earth Pit to ECP 1C-35mm ² PVC cables	100	R.ft		
16.6	Conduit for Earth Cable 38 mm dia. uPVC pipe class 'D'	100	R.ft		
16.7	Supply, installation of Bentonite Moisture Retaining Clay, Powder. Weight: 25kg/Bag	5	Nos.		
16.8	Supply, installation of Earth Connecting Point (ECP) or Equipotential bar made with 50mm wide and 5mm thick Copper. Bar shall be provided with holes suitable for installation ECP shall be enclosed in appropriate size of powder coated metal enclosure with front accessible cover. The cover shall be made with 16 SWG sheet.				
16.9	Supply, installation of Copper Earth Bar (4-Way) Single Disconnecting Link, Length: 475mm	1	Nos.		
	Note: Contractor is advised to confirm the cable running lengths and termination as per site conditions before commencement of work, any missing item which is not specified but essential to complete the system should be incorporated by contractor system should be complete in all respect, any item which is not covered will be paid by his own cost no variation will be entertained.				
17.0	ELECTRICAL HANDHOLE				
17.1	Excavation, Concreting & making RCC Handhole 3'-0" x 3'-	4	Nos.		



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Reception Building Electrical Works

	0" x 3'-0" with heavy duty cover. Complete in all respect as per drawing or as directed by the Engineer.				

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ALLIED WORKS AT MALIR, KARACHI

Control Room Watch Tower Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
	GENERAL NOTES:				
1	Quantities shown in BOQ are tentative, contractor should verify all quantities as per drawings and deliver at site as per actual quantity.				
2	All material should be procure from authorized vendor /supplier.				
3	Rate should be quoted based on the specified material/supplier as mentioned in approved material list.				
4	Any material which is procured without consultant approval is not acceptable and should be removed at their own cost by the contractor.				
5	This is the responsibility of electrical contractor to prepare coordinated shop drawings submitted to consultant for review and approval before execution of works at site.				
6	This is the responsibility of contractor to coordinate with other services at site.				
1.0	LV POWER CABLES				
	Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required, clipped to surface with cleats or on previously installed cable tray/ trenching or raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect.				
1.1	4C-16 Sqmm Cu/PVC/PVC Cable+1C-10 Sq.mm Cu/ PVC Cable as a ECC.	200	R.ft		
2.0	LV DISTRIBUTION BOARD				
	Supply & Installation, connection, testing & commissioning of following mixed capacity MCCB / MCB / Magnetic Contractor / Relay etc. LV MDB /SMD/DB's Surface / Flush Type, Floor / Wall with 16 SWG Sheet steel housing with approved color code, complete with all mounting accessories as per Single Line drawings and specifications, complete in all respect.				
2.2	DB-Control Room	1	No.		
3.0	INTERNAL WIRING				
3.1	POINT WIRING				
	Supply, installation, Testing, commissioning and connection of Point Wiring for light Fixture and Fan with 3 x 1c x1.5 Sq.mm				

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Control Room Watch Tower Electrical Works

	PVC insulated copper wire in 25mm dia. PVC conduit surface/concealed mounted including all required mounting and installation accessories, etc., complete in all respects.				
a)	From Light controlled switch to 1st Light fixture.	5	No.		
b)	Point wiring b/w light fixture to fixture	10	No.		
c)	Exhaust Fan Point.	1	No.		
d)	Ceiling Fan Point	2	No.		
3.2	CIRCUIT WIRING				
a)	Supply, installation, testing, commissioning, and connection of circuit wiring from the Distribution Board (DB) to the lighting control First switchboard and from first to other switchboards, using 3 × 1C × 2.5 sq.mm single-core PVC insulated copper conductors drawn in 25 mm diameter PVC conduit, including all necessary installation and mounting accessories, complete in all respects as per approved drawings and specifications.	5	No.		

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Item No	Description of Items	Qty.	Unit		
b)	Supply installation and connection of Wiring for 13A, Multi Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	3	No.		
c)	Same as item b but point to point wiring	3	No.		
d)	Supply installation and connection of Wiring for 15A, Multi Pin/Flat pin switch socket outlets from DB to first outlet point with 3x1C-4mm ² PVC insulated copper wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW/UPS circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
e)	Same as item 3.2 (d) but point to point wiring	3	No.		
f)	Supply, Installation & Wiring of 1.0/2.0 TR split AC from DB to respective indoor isolator/socket and from indoor to outdoor isolator with 3x1C-6mm ² PVC cable in 25mm dia PVC conduit complete with all required installation and mounting accessories complete in all respects per drawing and specification.	1	No.		
4.0	RACEWAY & BOXES for ELECTRICAL SYSTEMS				
	Supply and installation of following sizes PVC conduit with all required installation accessories like tee, bend, etc., for sub-main cables on concealed / surface, complete in all respect as per drawing & specification. Complete in all respect.				
4.1	25 mm dia. PVC conduit	1000	R.ft		
4.2	50 mm dia. uPVC Class 'D' conduit	200	R.ft		
4.3	75 mm dia. uPVC Class 'D' conduit	250	R.ft		
4.4	Supply & installation of 16 SWG sheet steel with powder coated Floor Type technologic boxes to accommodate following devices: 1No. 13A, Multi-Pin(Simplex) switch socket outlet. 1No. 13A, Flat-Pin(Duplex) switch socket	2	No.		

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Control Room Watch Tower Electrical Works

	outlet. 1 No. 2x RJ45 device plate outlet for data and voice outlet complete in all respect.				
4.5	Back Box: Supply and installation of 16 SWG sheet steel powder coated back box with brass earth terminal, complete in all respect.	25	No.		
5.0	SWITCHES & SOCKET OUTLET				
	Supply & Installation of following type switches / sockets as per design drawings & specification, complete in all respect. (Schneider Pino Series or Equivalent)				
5.1	10A, One gang switch unit.	1	No.		
5.2	10A, Two gang switch unit.	6	No.		
5.3	13A, Multi Pin switch socket unit.(Simplex).	7	No.		
5.4	15A, Multi Pin switch socket unit.(Simplex).	5	No.		
5.5	13A flat pin switch socket unit.(duplex)	2	No.		

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Control Room Watch Tower Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
6.0	INTERIOR LIGHTING				
	Supply Installation, Termination and Commission of following lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, electronic ballast, connector (Porcelain), supports, hanging & fixing materials (Such as Steel Rod/Chain), etc. including all mounting and installation accessories. Complete in all respects.				
6.1	LED Downlight, light fixture (Recessed Type), 16 watt (4000K)	10	No.		
6.2	LED Downlight, light fixture (Surface Type), 16 watt (4000K)	5	No.		
7.0	ESCAPE ROUTE LIGHTING				
	Supply Installation, Testing and Commission of the following Emergency lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, 3 Hour Back up battery, connector (Porcelain), supports, hanging & fixing materials (Such as Steel Rod/Chain), etc. including all required mounting and installation accessories. Complete in all respects.				
7.1	LED Emergency light fixture, Wall Mounted, 8 watt lamp self maintained type.	2	Nos.		
7.2	LED Emergency light 3 watt lamp non maintained type.	2	Nos.		
7.2	LED Emergency Exit light 8 watt lamp with directional pictogram.	1	Nos.		
8.0	FAN & EXHAUST FAN				
	Supply, installation and connection of following size of Ceiling fan, with all fixing accessories.				
a)	Ceiling Fan 56"	2	No.		
b)	12 inch dia. wall / glass mounted exhaust fan, with louvers.	1	No.		
9.0	STRUCTURED CABLING				
	Supply, installation, testing & commissioning of following items for data/voice communication system including all material, labor, tools, installation and mounting accessories. Complete in all respects. Quantities for cables shown in BOQ are estimated and taken from drawings. Contractor is advised to take measurement at site before commencement of works.				
9.1	Duplex Face plate with 2 Nos I/Os RJ-45 UTP CAT-6 for Data/Voice, including shutters, complete in all respect	15	Nos.		

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9.2	Supply, installation of 4 pair CAT-6 UTP cables for data system from rack to each workstation in already laid 25mm dia PVC conduit. Complete in all respects.	2500	R.ft		
9.3	Supply and installation of 25mm dia PVC conduit with all installation and mounting accessories like tee, bends etc., for above cables on concealed / surface, complete in all respect as per drawing & specification.	500	Mtrs.		
9.4	Testing, Commissioning, proper tagging, Fluke Testing & Submission of Fluke Report along with 20 year warranty certificate from principal of brand for complete DATA Communication System by authorized local representative of the manufacturer.	1	Job.		
9.5	Supply, installing, Testing & Commisioning of following multi pair telephone cable in already laid appropriate size of PVC conduit complete in all respects.				
	10 pair Cable	300	R.ft		

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Bill of Quantities

Item No	Description of Items	Qty.	Unit		
10.0	EARTHING SYSTEM				
	Supply, installation and connecting Chemically Enhanced Earth using copper bonded rod filled with soil conditioning material with 10'ft deep boring and back fill, chemical to enhance conductivity. Complete with termination clamps, cable from earth rod/pipe to inspection pit etc. as shown in drawings and details complete in all respects as per specification.				
10.1	Supply, installation of 20 mm dia, 3000mm long threaded copper bonded earth rod including Cable Clamp (type G), Complete in all respects.	2	Nos.		
10.2	Supply & installation of inspection pit with grey polymer lid as per drawing & specification.	2	Nos.		
10.3	Supply, installation and connection of the following PVC insulated/Bare Cu earthing conductors in conduit/directly buried as per drawings and specifications.				
10.4	From Equipment Body to ECP 1C-35 mm ² PVC cables (Green)	100	R.ft		
10.5	From Earth Pit to ECP 1C-35mm ² PVC cables	100	R.ft		
10.6	Conduit for Earth Cable 38 mm dia. uPVC pipe class 'D'	100	R.ft		
10.7	Supply, installation of Bentonite Moisture Retaining Clay, Powder. Weight: 25kg/Bag	5	Nos.		
10.8	Supply, installation of Earth Connecting Point (ECP) or Equipotential bar made with 50mm wide and 5mm thick Copper. Bar shall be provided with holes suitable for installation ECP shall be enclosed in appropriate size of powder coated metal enclosure with front accessible cover. The cover shall be made with 16 SWG sheet.				
a)	Supply, installation of Copper Earth Bar (4-Way) Single Disconnecting Link, Length: 475mm	1	Nos.		
	Note: Contractor is advised to confirm the cable running lengths and termination as per site conditions before commencement of work, any missing item which is not specified but essential to complete the system should be incorporated by contractor system should be complete in all respect, any item which is not covered will be paid by his own cost no variation will be entertained.				
11.0	ELECTRICAL HANDHOLE				



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	Excavation, Concreting & making RCC Handhole 3'-0" x 3'-0" x 3'-0" with heavy duty cover. Complete in all respect as per drawing or as directed by the Engineer.	2	Nos.		

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Watch Tower Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
	GENERAL NOTES:				
1	Quantities shown in BOQ are tentative, contractor should verify all quantities as per drawings and deliver at site as per actual quantity.				
2	All material should be procure from authorized vendor /supplier.				
3	Rate should be quoted based on the specified material/supplier as mentioned in approved material list.				
4	Any material which is procured without consultant approval is not acceptable and should be removed at their own cost by the contractor.				
5	This is the responsibility of electrical contractor to prepare coordinated shop drawings submitted to consultant for review and approval before execution of works at site.				
6	This is the responsibility of contractor to coordinate with other services at site.				
1.0	LV POWER CABLES Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required, clipped to surface with cleats or laid underground in PVC conduit as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect.				
1.2	1x3c- 6 Sq mm Cu/PVC/PVC Cable from Reception Building MDB	500	R.ft		
2.0	LV DISTRIBUTION BOARD				
	Supply & Installation, connection, testing & commissioning of Wall mounted 6 way 16 SWG Powder Quoted distribution box, high Quality consist of Incoming & outgoing MCB, and Indication lamp complete with all required installation and mounting accessories as per Single Line drawings and specifications, complete in all respect.				
2.1	DB-Watchtower	1	No.		
	Incoming 01 No 20 Amp DP MCB Outgoing 01 No 10 Amp SP MCB 01 No 16 Amp SP MCB 01 No 16 Amp SP MCB (Spare)				

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3.0	INTERNAL WIRING				
3.1	POINT WIRING				
	Supply, installation, Testing, commissioning and connection of Point Wiring for light Fixture and Fan with 3 x 1c x1.5 Sq.mm PVC insulated copper wire in 25mm dia. PVC conduit surface/ concealed mounted including all required mounting and installation accessories, etc., complete in all respects.				
a)	From Light controlled switch to 1st Light fixture.	2	No.		
b)	Point wiring b/w light fixture to light fixture	5	No.		
d)	Ceiling Fan point wiring	1	No.		
3.2	CIRCUIT WIRING				
a)	Supply, installation, testing, commissioning, and connection of circuit wiring from the Distribution Board (DB) to the lighting control switchboard, or between switchboards to switchboard, using 3×1c -2.5 sq.mm single-core PVC insulated copper conductors drawn in 25 mm diameter PVC conduit, including all necessary installation and mounting accessories, complete in all respects as per approved drawings and specifications.	2	No.		

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Item No	Description of Items	Qty.	Unit		
b)	Supply installation and connection of Wiring for 13A, Multi Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
c)	Same as item no 3.2 (b) but point to point wiring	3	Nos		
4.0	RACEWAY & BOXES for ELECTRICAL SYSTEMS				
	Supply and installation of PVC conduits of the following sizes, complete with all required installation accessories such as tees, bends, couplers, and saddles, for sub-main cables. The work shall include concealed or surface installation, conduit laying, excavation of soil where required, and reinstatement. Complete in all respects as per approved drawings and specifications.				
4.1	25 mm dia. uPVC conduit (for Telephone/Intercom Cable)	400	R.ft		
4.2	50 mm dia. uPVC Class 'D' conduit (for Power Cable)	400	R.ft		
4.4	Back Box: Supply and installation of 16 SWG sheet steel powder coated back box with brass earth terminal, complete in all respect.	10	No.		
5.0	SWITCHES & SOCKET OUTLET				
5.1	Supply & Installation of following type switches / sockets as per design drawings & specification, complete in all respect. (Schneider E-series or Equivalent)				
a)	10A, Two gang switch unit.	2	No.		
b)	13A, Multi Pin switch socket unit.(Simplex).	3	No.		
6.0	INTERIOR LIGHTING				
6.1	Supply Installation, Termination and Commission of following lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, electronic ballast, connector (Porcelain), supports, hanging & fixing materials(Such as Steel Rod/Chain), etc. including all mounting and installation accessories. Complete in all respects.				

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a)	LED Surface mounted Downlight, light fixture (Surface Type), 16 watt (4000K)	5	No.		
7.0	ESCAPE ROUTE LIGHTING				
7.1	Supply Installation, Testing and Commission of the following Emergency lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, 3 Hour Back up battery, connector (Porcelain), supports, hanging & fixing materials(Such as Steel Rod/Chain), etc. including all required mounting and installation accessories. Complete in all respects.				
a)	LED Emergency light fixture, Wall Mounted, 8 watt lamp self maintained type.	2	No.		
b)	LED Emergency Exit light fixture, 8 watt lamp with directional pictogram, self maintained type.	1	No.		
8.0	CEILING FAN				
8.1	Supply Installation, Testing and Commission of following size of Ceiling fan, with all fixing accessories.				
a)	Ceiling Fan 56"	1	No.		

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Watch Tower Electrical Works

Bill of Quantities

Item No	Description of Items	Qty.	Unit		
9.0	VOICE OUTLET & CABLING				
	Supply, installation, testing & commissioning of following items for voice communication system including all material, labor, tools, installation accessories. Complete in all respects. Quantities for cables shown in BOQ are estimated and taken from drawings. Contractor is advised to take measurement at site before commencement of works.				
9.1	Single Face plate RJ-11 I/Os, including shutters, back boxes complete in all respect.	5	Nos.		
9.2	Supply and installation of 25mm dia PVC conduit with all accessories like line adapters etc., concealed / surface, complete in all respect as per drawing & specification.	60	R.ft		
9.3	Supply, installing, Testing & Commissioning of following multi pair telephone cable in already laid appropriate size of PVC conduit complete in all respects.				
a)	2 pair Cable	500	R.ft		
9.4	Supply and installation of 2 port Telephone / Intercom junction box.	1	No		
10.0	ELECTRICAL HANDHOLE				
	Excavation, Concreting & making RCC Hand hole 1'-0" x 1'-0" x 2'-0" with heavy duty cover. Complete in all respect as per drawing or as directed by the Engineer.	1	Nos.		

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ALLIED WORKS AT MALIR, KARACHI

External Electrical Works

Bill of Quantities

Item No.	Description Of Items	Qty.	Unit		
1	<u>SECTION - A : STREET LIGHTING SYSTEM</u>				
1.1	Lighting Pole:				
	Supply and installation of hot-dipped galvanized inside and outside with 4mm wall thickness Octagonal steel poles. Including base plate, galvanized J bolt, nuts and washer, self locking inspection weather proof type door with rubber gasket, earthing lugs strip inside pole, special key, as per specification and details shown on the drawings. The product complying with the specification shall be used or approved by the Engineer ;				
a)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Single arm.	25	Each		
b)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Double arm.	2	Each		
c)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Triple arm.	3	Each		
d)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Bracket for Flood lights.	2	Each		
1.2	Street Light Fixtures:				
	Supply, installation, testing and commissioning of LED street light fixture/Flood Light fixture. The fixture shall be IP 66 rated, non-corrosive die cast aluminum housing, spigot aluminum reflector, toughened glass cover, silicone rubber gasket. Complete in all respects as per specification and drawing. Light fixture sample to be submitted with technical data sheets and schedule of Technical data to be filled for each light fixture as mention in specification and to be submitted to the Consultant for the approval.				
a)	140 watts LED Lamp.	30	Each		
b)	250 watts LED, Flood Light fixture..	5	Each		
1.3	Cable Terminal Box				
	Supply, installation, testing and commissioning of following cable terminal box comprising with 2 Amp miniature circuit breaker (MCB) including 415 volt high voltage resistance Copper terminal, Complete in all respects as per specification and drawing.				
a)	Cable Terminal Box with 1x2 Amp miniature circuit breaker.	23	Each		
b)	Cable Terminal Box with 2x2 Amp miniature circuit breaker.	2	Each		
c)	Cable Terminal Box with 3x2 Amp miniature circuit breaker.	1	Each		
d)	Cable Terminal Box with 2x2 Amp miniature circuit breaker.	2	Each		
1.4	Cable between Pole Terminal box to light fixture:				

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	Supply, installation, testing and commissioning of 3 Core - 2.5 mm ² PVC/PVC Copper Conductor Cable between Pole Terminal box to light fixture, complete in all respects as per drawing and specifications.	1,500	R. ft		
1.5	Pole foundation:				
	Providing and Construction of Pole foundation in concrete class "A", reinforcement as per AASHTO M31, lean concrete etc., in accordance with specifications including excavation, backfilling and disposal of surplus earth. Complete in all respect as per drawing or as directed by the Engineer.	28	Each		
1.6	Street Light Control Panel:				
	Supply, installation, testing & commissioning of following outdoor type Street Light Control Panel (IP-65) rated, as per single line schematic diagram including provision of Pad Mounted Foundation, complete in all respects as per drawing and specification :-				
	SLCP-1 :	1	Each		
	INCOMING :				
	1 No 50A TP MCCB (Isc: 15 KA)				
	OUTGOING :				
	09 Nos 16A TP MCCB (Isc:10 KA)				

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External Electrical Works

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Item No.	Description Of Items	Qty.	Unit		
	1 No. Surge Protector (15-20 kA)				
	1 No. 3 Phase digital Multimeter				
	1 No. Photo sensor with manual bypass timer contactor arrangement.				
1.7	LV Cable for Street Lighting:				
	Supply, laying, testing and commissioning including termination at both ends of Cu multicore 600/1000 voltage grade, Cu/PVC / SWA / PVC for street light cable laid directly in the already excavated trench from nearest source to street light control panel and street light control panel to street light Terminal box including supply and installation of all fixing and termination material, brass cable glands, ferrules, lugs, ties, accessories, etc., Complete in all respect as per drawing and specification.				
a)	4C - 25 mm ² PVC/SWA/PVC	2,300	R. ft		
b)	4C - 16 mm ² PVC/SWA/PVC	700	R. ft		
1.8	Main LV Cable for Street Light Control Panel from Main Feeder Panel:				
	Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required in raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect as per drawing & Specification.				
a)	4C - 35 mm ² PVC//PVC	40	R. ft		
1.9	Excavation and backfilling for Street Lighting Cable:				
	Excavation and backfilling of every type of trench in any type of soil within the project area for laying of street light cables, including sand cushion, protective bricks, warning tape and excavated earth compaction in layers not exceeding 9 inch thick, site cleaning etc. as per drawing and specification or as directed by the Engineer.				
a)	Excavated earth back filling and compaction	13,000	Cu.ft		
b)	River Sand (Bed and cover)	400	Cu.ft		
c)	Bricks (225 x 112 x 75) mm	2,000	Sq.ft		
d)	Warning Tape with 300 mm width and 0.5 mm thickness	3,000	R.ft		
1.10	Earthing Cable:				
	Supply, laying, testing and commissioning of single core copper wire, as earth protective conductor (ECC), run along with the cable, including all jointing and termination accessories, cable lugs, ferrules, etc. Complete in all respects as per drawing and				

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	specification.				
a)	1C - 16 mm ² PVC	400	R. ft		
b)	1C - 10 mm ² PVC	500	R. ft		
1.11	Earth Rod Installation for Light Pole:				
	Supply, installation, testing and commissioning of earthing system with 3 meter long & 20 mm dia earth Copper rod at both end of each circuit of street light, including boring up to (12 ft) depth or as required to achieve an earth resistance of ≤ 3 ohms including 16 sq mm single core PVC insulated wire from earth rod to lighting pole, marconite concrete, drilling in ground etc., complete in all respect as per specification and drawing or as directed by Engineer.	28	Each		
1.12	Earth Rod Installation for SLCP:				
	Supply, installation, testing and commissioning of earthing system as a protective Earthing for SLCP with 3 meter long & 20 mm dia Earth Copper rod including PVC insulated Copper Earth conductor 2 x 35 sq.mm in 50 mm dia G.I. pipe, up to Earth connecting point, inspection chamber, marconite concrete, drilling etc., to achieve less than 3 ohms specified Earthing results. complete in all respect as per drawing and specification or as directed by Engineer.	1	Each		

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Item No.	Description Of Items	Qty.	Unit		
2	<u>SECTION - B : CCTV SYSTEM.</u>				
	Supply, installation, testing and commissioning of CCTV outdoor type as per technical specifications / Standards, comprising of following, interconnected with auxiliary equipment. Complete in all respects, in accordance with approved drawings and specifications, and to the				
2.1	4MP EXIR VF Network Bullet Camera, 1/3" Progressive Scan CMOS, 2.8-12 MM Motorized VF Lens, BLC up to 30 m IR distance, SD Card support, 3D DNR, POE, H.265, IP67	22	Each		
2.2	Outdoor IP-based 4 MP IR PTZ surveillance Camera system suitable for long range monitoring up to 1 km, complete in all respects,	2	Each		
2.3	32 channel 4K embedded NVR with H.265 Decoding, 4 Sata Ports, 2 HDMI/VGA Port, 320 MBPS Bandwidth Network Throughput, 16 Alarm I/P & 6 O/P, 16 POE Ports, ONVIF with 30 days recording @30FPS & H.265	2	Each		
2.4	Seagate, 20 TB 3.5" SATA HARD Drive 256 MB Cache for 90 Days Storage.	10	Each		
2.5	50 inch LED Color TV full HD wall mounted with bracket & accessories	1	Each		
2.6	Patch Panel CAT-6, 12 PORTS (LOADED)-568 A/B with cable management tray, rear, size 1U - SIZE 1U - ACTASSI	1	Each		
2.7	Patch Panel CAT-6, 24 port (Loaded)-568 A/B with cable management Tray, Rear, size 1U - ACTASSI	2	Each		
2.8	Patch Cord for camera, 3ft each	25	Nos		
2.9	Core I7-PC having minimum 3.4 GHZ Processor, 16 GB RAM, 2TB HDD, GBE Network Card, Licensed WINDOWS 10 OS Keyboard, Mouse & associated accessories.	1	Each		
2.10	24-Port GIGABIT Smart Switch with 16 GIGABIT PoE Port & 2 COMBO SFP Port, 30W POE capacity for each Port (TP Link / Ruijie).	2	Each		
2.11	Power Supply for Industrial Switch 75W 48V DC Single Output	1	Each		
2.12	Industrial 4-Port 10/100/1000T POE & 2 PORT 100/1000X SFP Ethernet Switch	2	Each		
2.13	2-core single-mode fiber optic cable as a backbone from existing location to IT rack located in Control Room.	150	R.ft		
2.14	CAT-6, POE Cable from IT rack to each Camera.	5,000	R.ft		
2.15	Supply, installation, testing and commissioning of Pole mounted IP 65 rated Enclosure Box 3' x 3" with 3 Nos I/O switch (Cat 6 RJ45) as per drawing.	25	Each		
2.16	Supply, installation, testing and commissioning of Pole mounted IP 65 rated Enclosure Box for POE switch as per drawing.	2	Each		

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2.17	42 U Server rack Floor standing complete with all accessories such as adjustable mounting rails, vertical & horizontal cable managers, rack-mount PDU, cooling fan unit, fixed shelf, earthing kit, cable entry provisions (top & bottom), levelling feet, and all necessary mounting hardware, fully installed and commissioned.	1	No		
2.18	2 KVA On-Line UPS With Batteries	1	No		
2.19	4 Port ODF with 4 nos. of fiber patch cord 1 meter	1	No		
2.20	Programming, testing & commissioning of the system	1	Job		
3.0	Underground uPVC Class D Conduit for CAT6 Camera Cable Laying				
	Supply and installation of uPVC Class 'D' conduit of specified diameter for underground CAT6 Camera Cable Laying, including all fittings (tees, bends, couplers, etc.), trenching, sand bedding, backfilling, compaction, and complete installation as per drawings and specifications.				
a)	50 mm dia. uPVC conduit	2,000	R.ft		
b)	75 mm dia. uPVC Class 'D' conduit	1,000	R.ft		

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Item No.	Description Of Items	Qty.	Unit		
4.0	RCC Handhole				
	Construction of 2' x 2' RCC handhole with suitable cover and frame for underground CAT6 camera cable, including excavation, sand bedding, concrete casting, cable entry/exit openings with bushings, backfilling, leveling, and all civil works as per approved drawings and specifications.	13	Nos.		
5.0	<u>SECTION - C : Pedestrian Access Control System (PACS)</u>				
	Supply, installation, testing, and commissioning of following Pedestrian Access Control System , comprising access controller hardware, card/finger print/biometric readers, control software, power supply, cabling, and all necessary accessories, complete in all respects as per approved drawings, specifications, and instructions of the Engineer / Consultant.				
5.1	Facial Recognition Cameras (FRC)				
	Supply, installation, testing, and commissioning of 4 MP Outdoor Facial Recognition Camera dome type with varifocal lens (6–22 mm), AI analytics, True WDR, IR range 30 m, H.265 video compression, PoE, IK10 & IP67 protection, including power adapter, junction box, and mounting bracket. Complete with all power/control cabling, installation, and commissioning as per approved drawings, specifications or as directed by the Engineer/Consultant.	4	Nos		
5.2	Data Network for Pedestrian Access Control System (PACS)				
	Supply, Installation, testing and commissioning of following Items for the PACS Data Networking System;	1	Job		
a)	Data Cabinet:				
	Refer to item # 2.16 (already included)				
b)	Network Switch (Indoor)				
	Indoor network switch rack mounted, complete as specified below;				
	• 24 Gigabit Ethernet (10/100/1000 Mbps) downlink ports.				
	• 2 SFP+ uplink ports				
	• Management Interface: Web, POE Enabled				
c)	Network Cable				
	Category: CAT-6, Type: UTP, Max Bandwidth support :1G				
5.3	Visitor Management System (VMS)				

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	Supply, installation, testing, and commissioning of a complete Visitor Management System (VMS), fully integrated with the centralized Access Control System for both pedestrian and vehicular access. The scope shall include all associated cabling, mounting hardware, interfacing, software configuration, system integration, testing, and final commissioning, in accordance with the approved drawings, project specifications, and engineer's instructions. which included the following items and all required items to complete the job either mentioned or not but required to the job successfully. contractor should include these items rate in the quoted price. complete in all respect.				
a)	E-Tags: Compact size, Improved sensitivity, Laser-engraved card number to effectively prevent wear or fading, EV adhesive, enhanced UV resistance, 860~960MHz, ISO 18000-6C or EPC Class1 Gen2, IC of NXP U9, Marking of EPC / WG55 / 32 bit, can do Read and Write Function, Comparison of reading distance must be L99 x 150% or L99 x 100%, Antena Material made of Copper Foil, should have Logo printed on the Tags. Anti theft material.	500	Nos		

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Item No.	Description Of Items	Qty.	Unit		
b)	E-Tags Encoder; with Light weight and potable, compliant with EPC Gen 2 (ISO 18000-6C) standard, built-in 2.2 inches LCD screen and 23dBm RF module with 0.54dBi gain antenna, user can get the electric label or particular card information from LCD screen directly, Built-in Lithium battery and charging compatible with mobile devices, can stored 19,440 sets data available, frequency should be 902-928 MHz, reading range must be less than 50 cm, can only do Read Only function, can support H3,4 chip tags can be used Vehicle tags and Hand-held tags, have Watchdog function, 12VDC power Supply. Must be FCC ID Certified, should have GDRP compliance	1	Nos		
6.0	<u>SECTION - D : Vehicle Access Control System (VACS)</u>				
	Supply, installation, testing, and commissioning of a following complete Vehicle Access Control System (VACS) to provide automated monitoring and control of vehicle entry and exit points, enhancing security, safety, and traffic management within the facility, complete in all respects in accordance with the approved drawings, specifications, and instructions of the Engineer/Consultant. The system shall comprise, but not be limited to, the following:				
6.1	Road Blocker				
	Shallow Mount Road Blocker: Supply, installation, Shallow Mount Hydraulic Road Blocker (4.2m blocker length, 120cm raised height, when opened, 40cm blocker depth and lower times 3-5 sec, Material ST 37, Color RAL 1028 yellow/RAL 9005 black, Road blocker width 200cm to 600cm, should have test cleared Crash Test till PAS68: V7500{N3}/80/90:0.0/0, DOSSD-STD-02.01, A03/2003/L3, must have 2 units of 10m hydraulic hoses, have certification including K12, M50, ASTM F2656, IWA14-1, 50 tons of load per axle resistance, heavy duty structure, S235 type of steel must be used, hinges made of Heavy duty with hardened steel, 380 V, 3 Phase, 50-60 Hz (or 220 V/ 440 V etc., three phase, 50-60 Hz optional by a transformer), in case of power failure Manual hand pump, (or Hydraulic accumulator, DC motor and batteries or UPS (optional)), in emergency 1.5 seconds (optional), Raise, lower, emergency stop, key operated, 'keyboard in use' light indicator, proximity sensors to sense the position of Blocker,	2	Nos.		

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	dual vehicle safety loop detector, motor power of up to 4KW and 1500 rpm, can be operated by desktop keyboard, can integrate with Red & Green Traffic Lights, Must be Certified with following;- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1Should have EU, EC and EN Certification. include all civil works, complete in all respects, as per approved drawings, project specifications or as directed by the Engineer/Consultant.				
6.2	Manual Boom Barrier				
	Supply and installation of manual K-rated crash-tested Boom Barrier of specified length below with 4" dia (3 mm thick) boom arm and 3" dia (2.45 mm thick) support post, heavy-duty S235 steel construction, complete with manual lifting and locking mechanism, hot-dip galvanized and painted (RAL 1028 Yellow / RAL 9005 Black), The scope shall include civil foundation works, anchor bolts, installation, alignment, primer and finish painting, and complete erection, ensuring proper manual operation and structural stability and compliant as per PAS68 / K12 / M50 / ASTM F2656 / IWA14-1. Complete in all respects as per approved drawings, specifications, and as directed by the Engineer or Consultant.				
a)	23 Feet Clearance Boom Barrier	1	No		
b)	Same as the above item 6.2 (a), but dismantling and reinstallation of the existing Boom manual Barrier at the new location (car lane), including all required civil works. Complete in all respects as per approved drawings, specifications, and as directed by the Engineer/Consultant.	1	Job		

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Item No.	Description Of Items	Qty.	Unit		
6.3	Electromechanical Boom Barrier				
	Supply, installation and commissioning heavy Duty 2-4 meters Length Automatic Parking Barrier with Flashing Light, 220 Volt power, 1 Phase , 50-60 Hz, 3-4 sec operating time, folding arm, Environmental durability with Galvanized steel, RAL7012 powder coated , furnaced, must have PLC controller integrated, if power failure gear can be released by Allen Key, can be raised or lowered by a push button operations, must have I/O's to connect any card reader, extra override keyboard etc. later on, 550 Watt or Motor Power, -25 °C and +65 °C, %95 non-condensing humidity, can adjust 5sec delay time, IP55 rated, IP67 rated (control cabinet), Arm is aluminum with a special elliptical like cross-section design , Low power consumption and silent running, Compatible with all access control systems, Red & Green LED Light on the Boom, Flashing Light while it moves, Safety photocells, pneumatic edge sensor, dual vehicle safety loop detector, UPS with separate cabinmate (optional) Dual channel Loop Detector. The make shall be Optima B300 or approved by the Consultant/Client. Complete in all respect including Power Supply Control Cable and Cat 6 cable from control Room to Electromechanical Boom Barrier as per manufacturer recommendation. Must be Certified with following;- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6 1Should have EU, EC and EN Certification.				
a)	Electromechanical Boom Barrier for Car with 9 ft Boom length	1	No		
b)	Electromechanical Boom Barrier for Truck with 18 ft Boom length	1	No		

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c)	Bike Barriers (2x Bike Barrier for Entry and 1x Bike Barrier for Exit) Supply, installation and commissioning heavy Duty 2 ft Length Automatic Barrier with Flashing Light, 220 volts Power, 3-4 sec operating time, 220 Volt power, 1 Phase , 50-60 Hz, 3-4 sec operating time, folding arm, Environmental durability with Galvanized steel (DX51D+Z) plate , RAL7012 powder coated , furnaced, if power failure gear can be released by Allen Key, minimum speed of 3 seconds, can be raised or lowered by a push button operations, Enough I/O's to connect any card reader , extra override keyboard etc. later on, 550 Watt or Motor Power, -25 °C and +65 °C, %95 non-condensing humidity. Flashing Light, 220 Volt power, 1 Phase , 50-60 Hz, 3-4 sec operating time, folding arm, Environmental durability with Galvanized steel, RAL7012 powder coated , furnaced, must have PLC controller integrated, if power failure gear can be released by Allen Key, can be raised or lowered by a push button operations, must have I/O's to connect any card reader, extra override keyboard etc. later on, 550 Watt or Motor Power, -25 °C and +65 °C, %95 non-condensing humidity, can adjust 5sec delay time, IP55 rated, IP67 rated (control cabinet), Arm is aluminum with a special elliptical like cross-section design , Low power consumption and silent running, Compatible with all access control systems, Red & Green LED Light on the Boom, Flashing Light while it moves, Safety photocells, pneumatic edge sensor, dual vehicle safety loop detector, UPS with separate cabinmate (optional) Dual channel Loop Detector. The make shall be Optima B300-ART or approved by the Consultant/Client. Complete in all respect including supply Power Supply Control Cable and Cat 6 cable from control Room to Bike Barrier as per manufacturer recommendation. Must be Certified with following;- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1Should have EU, EC and EN Certification	3	Nos		

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Item No.	Description Of Items	Qty.	Unit		
6.4	UHF RFID Reader				
	Supply, installation, and commissioning of a UHF Reader including all accessories, with the following technical specifications. Complete in all respect including Power Supply Control Cable and Cat 6 cable from control Room to UHF Reader & Signal as per manufacturer recommendation. · Freq: 125 KHz and 902- 928 MHz, Standard EM Standard, Range 6 meter, IP65, Housing ABS, ISO18000-6C· Standard - ISO18000-6C (EPC Gen2)· Protection - IP65. Housing Material - ABS/Ivory- Support Tags - H3/H4/H9/U9 chip tags can be used Vehicle tags and Hand-held tags- Communication Interface: Wiegand or RS485- Baud Rate of 9600 bps-Reading Range can be 4-6 Meters and as long as 15m (The power consumption is adjustable from 10%~100%, the reading range will increase/decrease by different power consumption.)Have Read Only Function with Watchdog Power: Less than 18W, with 12VDC Power Supply and less than 1A- 1 Bi-color LED Light Indicator- Can be operational in -20°C to +55°C temperature can be integrated with IR or Induction coil, modulator scheme PR-ASK, ASK, eission power of 24.9 dBm (adjustable), receiving sensitivity of -85dBm, antenna connection 50 ohm UFL, and antenna gain of 11 dbi. Must be FCC ID Certified, should have GDRP compliance Complete in all respects as per approved drawings, specifications, and instructions of the Engineer/Consultant. The System Components shall be as follow:	3	Nos		
a)	02 Nos for vehicle entry				
b)	01 No for vehicle exit				
6.5	ANPR Cameras				
	Supply, installation, testing, and commissioning of Automatic Number Plate Recognition (ANPR) camera system, comprising high-resolution IP camera with built-in ANPR analytics, IR illumination for day/night operation, suitable lens for lane coverage, weatherproof housing (IP66 or better), mounting brackets, and all associated accessories. The scope includes necessary power supply, data cabling, integration with access control/parking management system, configuration, software setup, testing, and commissioning with all civil works.	6	Nos		



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	Complete in all respects as per specifications, drawings, and as directed by the Engineer/Consultant.				

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Item No.	Description Of Items	Qty.	Unit		
6.6	Line Scan UVSS				
	Supply, installation, testing, and commissioning of Fixed Under Vehicle Surveillance System (UVSS) for road security, including Charge-Coupled Device (CCD). Complete in all respects including Power Supply Control Cable and Cat 6 cable from control Room to Line Scan UVSS as per manufacturer recommendation. With following including all necessary civil works, integration with other systems, and making the system fully operational.· Material: Stainless Steel. Waterproof Grade: IP68, 50T· Image Resolution: 12000 × 6144; Camera Resolution: 5000 × 2048 pixels, Color camera 5mp, Image ata Interface Gigabit Ethernet (1000 Mbit/s), Frame Rate per second 30 fps, Focal length f=5 mm.. Image Type: Color· Power Supply: 24 VDC, 3 A· Signal-to-Noise Ratio: 48 dB. Features: AI-based Foreign Object Detection, ANPR Camera - System Memory 2 x 204-pin DDR3-1333/1600mhz SO-DIMM, up to 16GB.- Maximum diameter ratio is F= 1:2.8 ~16.-Power Requirements: 12-24V AC/DC +/- 15% 1.5VA max @230 V-Output Relay: N.O contacts (fail-safe in presence mode) or N.C. model-Material: High Heat ABS blend, St37 Steel & Stainless Steel top cover with thickness of 5mm- Environmental Conditions and Power Requirements: - 20°C/50°C & 12-24 V DC with Self-cleaning (optional) system Taking a picture of the underside of the vehicle with a high resolution automatic digital area scanner camera and displaying it on the screen. Alert on the monitor when a suspicious object is detected under the vehicle. Ability to scan vehicles moving at 0-50 km/h from both sides in two directions. Easy integration with many physical security products such as road blocks, barriers and license plate recognition systems. The ability to track the information recorded from the web interface from anywhere in the world. Must be Certified with following;- ISO 9001:2015-TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1Should have EU, EC and EN Certification. Complete in all respect as per drawing & Specification.	2	Job		
6.7	Tire Killer, at Exit Points				

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	Supply, installation, of Heavy Duty Manual one way tire killer size: 20 Feet, 6mm thick MS section, 8mm thick MS blades, Gravity based operation, Maintenance free and spring free operation, Independent operation of each spike, Vertical height of spike is 3.5 inches from surface, Individually replaceable MS blades, Flat bar to manually lock spikes in the down position, 30 ton loading capacity, Self-balancing mechanism, Space between each spike 3.5 inches, Top removable bar to close the tire killer to use the tire killer for entry.	1	Job		
6.8	MCP Door Controller				
	Supply, installation, testing, and commissioning of Electrically operated MCP Door Controller at exit site.	2	Nos		
6.9	Supply, installation, testing & commissioning of motorized gate system (gate will be provided by civil contractor) along with required size single or three phase motor 50 Htz as required for 800 kg each leaf of door and all other required control cables, controller, sensors, control switch and other required installation accessories to complete the job, either these items are mentioned or not in the description must be included in the rate. this gate must be oped and closed from the control room by manual operation. This system is required on both gates, 2 Nos entry and 2 Nos exit gates as per given civil design and weight of gate (1600 kg for each gate) in the civil boq. this item must complete in all respect with required complete motorized controlled gate system. gate must be opened 90 Degree and IP-55 weather resistant. operating temperature is 15 degree to 50 degree Celsius.	2	Jobs		

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Item No.	Description Of Items	Qty.	Unit		
6.10	Underground uPVC Class D Conduit for Control Cable Laying				
	Supply and installation of uPVC Class 'D' conduit of specified diameter for underground control cabling, including all fittings (tees, bends, couplers, etc.), trenching, sand bedding, backfilling, compaction, and complete installation as per drawings and specifications.				
a)	50 mm dia. uPVC class D conduit	1,500	R.ft		
b)	70 mm dia. uPVC Class 'D' conduit	300	R.ft		
7.0	<u>SECTION - E : MAIN FEEDER PILLAR & ALLIED WORKS</u>				
7.1	Feeder Pillar-1				
	Supply, installation, testing & commissioning of following outdoor type Main Feeder Panel (IP-65) rated, as per single line schematic diagram including provision of Pad Mounted Foundation, complete in all respects as per drawing and specification :-	1	No		
	INCOMING :				
	02 No 250A TP MCCB (Isc: 25 KA)				
	OUTGOING :				
	01 No 40A TP MCCB (Isc:15 KA)				
	02 Nos 60A TP MCCB (Isc:15 KA)				
	01 Nos 150A TP MCCB (Isc:15 KA)				
	01 No 250A ATS				
7.2	Main LV Cable for Feeder Panel (FP-1) from Existing Source:				
	Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required in raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc., complete in all respect as per drawing & Specification.				
a)	4C - 70 mm ² Cu/PVC/PVC + 1c- 35 mm ² as ECC	50	R.ft		
b)	4C - 120 mm ² Cu/PVC/PVC + 1c- 70 mm ² as ECC	450	R.ft		
7.3	Excavation and backfilling for FP-1 Main Cable:				
	Excavation and backfilling of every type of trench in any type of soil within the project area for laying of street light cables, including sand cushion, protective bricks, warning tape and excavated earth compaction in layers not exceeding 9 inch thick, site cleaning etc. as per drawing and specification or as directed by the Engineer.				

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a)	Excavated earth back filling and compaction	2,000	Cu.ft		
b)	River Sand (Bed and cover)	500	Cu.ft		
c)	Bricks (225 x 112 x 75) mm	3,000	Sq.ft		
d)	Warning Tape with 300 mm width and 0.5 mm thickness	500	R.ft		
7.4	Underground uPVC Class D Conduit for Main Cable Laying				
	Supply and installation of uPVC Class 'D' conduit of specified diameter for underground CAT6 Camera Cable Laying, including all fittings (tees, bends, couplers, etc.), trenching, sand bedding, backfilling, compaction, and complete installation as per drawings and specifications.				
a)	150 mm dia. uPVC Class 'D' conduit	400	R.ft		

Item No.	Description Of Items	Qty.	Unit		
7.5	Earth Rod Installation for FP-1:				
	Supply, installation, testing, and commissioning of a complete earthing system comprising a 3 m long, 20 mm diameter copper earth rod, including boring up to (12 ft) depth or as required to achieve an earth resistance of ≤ 3 ohms. The scope includes provision of 16 sq.mm bare copper earthing conductor from the earth rod to FP-1, with marconite conductive backfill compound, necessary excavation and drilling, clamps/connectors, and all associated accessories, complete in all respects as per specifications and drawings and as directed by the Engineer.	1	Each		
7.6	RCC Man Hole				
	Construction of 3' x 3' x 3' RCC hand hole with suitable cover and frame for underground CAT6 camera cable, including excavation, sand bedding, concrete casting, cable entry/exit openings with bushings, backfilling, leveling, and all civil works as per approved drawings and specifications.	7	Nos.		

Note: - Bidder shall be filled the offering description / specification in above column or submit separate sheet.

Schedule of Requirement

Within 6 Months after the award of Contract

SECTION VI – STANDARD FORMS FOR (Single Stage Two Envelope Procedure)

Table of Forms

Sr. No.	Form No.	Description	Proposal Part
1	Form T1	Letter of Bid – Technical Proposal	Technical Proposal
2	Form T2	Bidder Information Form	Technical Proposal
3	Form T3	Bidder's Eligibility / Qualification Criteria	Technical Proposal
4	Form T4	Affidavit for Bidder's Blacklisting Status	Technical Proposal
5	Form T5	Declaration for Ultimate Beneficial Owners Information	Technical Proposal
6	Form T6	Manufacturer's Authorization Form	Technical Proposal
7	Form T7	Code of Conduct	Technical Proposal
11	Form T8	Non-Disclosure Agreement (NDA)	Technical Proposal
8	Form F1	Letter of Bid – Financial Proposal	Financial Proposal
9	Form F2	Form of Bid Security	Financial Proposal
10	Form F3	Price Schedule	Financial Proposal

TECHNICAL PROPOSAL FORMS

Form T1 – Letter of Bid (Technical Proposal)

INSTRUCTIONS TO BIDDERS: (delete this box once you have completed the document)

Place this Letter of Bid in the first envelope "TECHNICAL PROPOSAL".

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

Note: All italicized text in black font is to help Bidders in preparing this form and Bidders shall delete it from the final document.

Date of this Bid submission: May 21, 2026

ITB No.: LP/T-4110/26/FA

Title of Procurement: Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment

To: Pakistan Security Printing Corporation (Pvt.) Ltd

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

- (a) The Technical Proposal, and
- (b) The Financial Proposal.

In submitting our Bid, we make the following declarations:

- (a) **No reservations:** We have examined and have no reservations to the bidding document, including addenda issued in accordance with Instructions to Bidders (ITB 9);
- (b) **Eligibility:** We meet the eligibility requirements and have no conflict of interest in accordance with ITB 3;
- (c) **Bid/Proposal-Securing Declaration:** We have not been suspended nor declared ineligible by the Procuring Agency based on execution of a Bid Securing Declaration or Proposal Securing Declaration in the Procuring Agency's country in accordance with ITB 4;
- (d) **Conformity:** We offer to supply in conformity with the bidding document and in accordance with the Delivery Schedules specified in the Schedule of Requirements the following Equipment: *Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment;*
- (e) **Bid Validity Period:** Our Bid shall be valid for the period specified in **BDS 17.1** (as amended, if applicable) from the date fixed for the Bid submission deadline specified in **BDS 23.1** (as amended, if applicable), and it shall remain binding upon us, and may be accepted at any time before the expiration of that period;
- (f) **Performance Security:** If our Bid is accepted, we commit to obtain a performance security in accordance with the bidding document;
- (g) **One Bid per Bidder:** We are not submitting any other Bid(s) as an individual Bidder, and we are not participating in any other bid(s) as a Joint Venture member or as a subcontractor, and meet the requirements, other than Alternative Bids submitted in accordance with **ITB 19**;
- (h) **Suspension and Debarment:** We, along with any of our subcontractors, suppliers, consultants, manufacturers, or service providers for any part of the contract, are not subject to, and not controlled by any entity or individual that is subject to, a temporary suspension or a debarment imposed by the Procuring Agency. Further, we are not ineligible under Pakistan laws;

- (i) **State-owned enterprise or institution:** *[select the appropriate option and delete the other] [We are not a state-owned enterprise or institution] / [We are a state-owned enterprise or institution but meet the requirements of];*
- (j) **Binding Contract:** We understand that this Bid, together with our Purchase Order shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (k) **Not Bound to Accept:** We understand that you are not bound to accept the Most Advantageous Bid or any other Bid that you may receive; and
- (l) **Fraud and Corruption:** We hereby certify that we have taken steps to ensure that no person acting for us, or on our behalf, engages in any type of Fraud and Corruption.

Name of the Bidder: *[insert complete name of Bidder]*

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

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

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

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

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

Form T2 – Bidder Information Form

[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.]

ITB No: LP/T-4110/26/FA

Title: **Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment**

Bidder: [Manager]

1. Bidder's Name <i>[insert Bidder's legal name]</i>
2. Bidder's actual or intended country of registration: <i>[insert actual or intended country of registration]</i>
3. Bidder's year of registration: <i>[insert Bidder's year of registration]</i>
4. Bidder's Address in country of registration: <i>[insert Bidder's legal address in country of registration]</i>
5. Bidder's Authorized Representative Information Name: <i>[insert Authorized Representative's name]</i> Address: <i>[insert Authorized Representative's Address]</i> Telephone/Fax numbers: <i>[insert Authorized Representative's telephone/fax numbers]</i> Email Address: <i>[insert Authorized Representative's email address]</i>
6. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i> ☐ Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above. ☐ Establishing that the Bidder is not under the supervision of the Procuring Agency 7. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

Form T3 – Bidder's Eligibility / Qualification Criteria

[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted.]

ITB No: LP/T-4110/26/FA

Title: **Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment**

Bidder: [Manager]

#	Eligibility / Qualification Criteria	Means of Verifications	Reference in Bid**	Bidder's Assessment (Y/N)
a.	This invitation for Bids is open to all reputed Firms/manufactures/suppliers / contractors.	Attach copy of valid NTN certificate.		
b.	Bidders should not be under a declaration of ineligibility for corrupt and fraudulent practices issued by any Government (Federal, Provincial), a local body and international or a public sector organization.	Undertaking on N.J stamp paper (Value of stamp paper should be as per required value as per stamp duty act)		
c.	The bidder must possess minimum ten (10) years of relevant construction experience in similar nature projects.	Completion Certificates issued by employers/procurement agencies		
d.	Valid PEC Registration - Category C-3 or Above.	Registration Certificate		
e.	Affidavit of Non-Blacklisting and Litigation Disclosure.	As per Provided Affidavit Format		
f.	Signed Acceptance of BOQ, Drawings, and Tender Conditions by the bidder.	Submissions in Tender Document		
g.	Submission of Valid Project-Specific OEM Authorization Certificate for all quoted Security Equipment.	Authorization certificate		
h.	Submission of Complete Technical Submittals and Data Sheets.	Submissions in Tender Document		
i.	Mandatory Pre-Bid Meeting Attendance.	Pre-bid Request sent to PSPC		
j.	Mandatory Site Visit verified through PSPC Entry Approval Log.	PSPC Site Visit request		
k.	Audited Financial Statements (Last 3 Years) and should be submitted along with the technical bid	Audited Financial Statement		
l.	They must be registered with tax authorities and are active tax payers.	Attach copy of valid GST certificate and reference of Active Taxpayer list of FBR.		
m.	The bidder and their deputed staff must submit an undertaking to comply with PSPC's Code of Conduct,	Undertaking as per attached format		

	using the prescribed format provided in the tender document.			
n.	The bidder must submit an undertaking to comply with all applicable HSE laws, regulations and industry standards; and with all HSE requirements of PSPC, using the prescribed format provided in the tender document.	Undertaking as per attached format		
o.	Any regular employee, contractual, or outsourced/third-party resource who are currently or were previously deputed on PSPC assignments during last 5 years are not authorized to participate in the bidding process for next 2 years either as a bidder or as a representative of any bidder/vendor. PSPC reserves the right to reject such bids at any stage of the procurement process.	Undertaking on Bidder's Letter head		
p.	Submission of NDA as per the prescribed format	As per Format Attached with this document		

Seal & Signature of Bidder:

Date:

Annex-1**Experience of Similar Assignment**

#	Assignment / Product Description	Company / Name of Customer	Contact Person Name / Contact Details
1.			
2.			
3.			
4.			
5.			

Please attach copies of work/Purchase orders, contract or customer reference letter/email or any other reference document that can substantially prove the above.

Details of Trained/Experienced Resources

#	Resource Name	Certificate Details	Certificate Issuance Date
1.			
2.			
3.			
4.			

Office Address

#	Company Name	Complete Office Address	Office Numbers
1.			
2.			
3.			

Form T4 – Affidavit for Bidder’s Blacklisting Status

ITB No: LP/T-4110/26/FA

Title: **Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment**

Bidder: _____

[Required on non-judicial stamp paper; value of Rs. 100 stamp paper should be as per required value as per Stamp Duty Act]

To:

Deputy General Manager (Purchase)
Purchase Department
Pakistan Security Printing Corporation (Pvt.) Ltd
Jinnah Avenue, Malir Halt,
Karachi –Pakistan

Affidavit for Bidder’s Blacklisting Status

Dear Sir,

I/We hereby confirm and declare that I/We, [Manager], has/have not been Blacklisted/Sanctioned by any Federal or Provincial Government Department, National Counter Terrorism Authority (NACTA), Agency, Organization or Autonomous Body anywhere in Pakistan during last 05 (five) years.

Detection of false declaration / statement at any stage of the entire Bidding Process / Currency of the Contract shall lead to Disqualification and forfeiture of Bid Security and/or Performance Guarantee and termination of contract.

Seal & Signature of Bidder: _____

Date: _____

9. Information about the Board of Directors (details shall be provided regarding number of shares in the capital of the company as set opposite respective names).

1	2	3	4	5	6	7	8
Name and surname (In Block Letters)	CNIC No. (in case of foreigner, Passport No)	Father's/ Husband's Name in full	Current Nationality	Any other Nationality (ies)	Occupation	Residential address in full or the registered/ principal office address for a subscriber other than natural person	Number of shares taken by each subscriber (in figures and words)
Total number of shares taken (in figures and words)							

10. Any other information incidental to or relevant to Beneficial Owner(s).

Name & signature

(Person authorized to issue notice on behalf of the company)

Seal & Signature of Bidder:

Date:

Form T6 – Manufacturer's Authorization Form

*[The Bidder shall require the Manufacturer or its authorized dealer in Pakistan to fill in this Form in accordance with the instructions indicated. This letter of authorization should be on the letterhead of the Manufacturer or its authorized dealer in Pakistan and should be signed by a person with the proper authority to sign documents that are binding on the Manufacturer. The Bidder shall include it in its Bid, if so indicated in the **BDS**.]*

Invitation No: LP/T-4110/26/FA

Title: **Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment**

Bidder: _____

To: *[Pakistan Security Printing Corporation (Pvt.) Ltd]*

WHEREAS

We [_____] , who are official manufacturers of *[insert type of goods manufactured]*, having factories at *[insert full address of Manufacturer's factories]*, do hereby authorize *[insert complete name of Bidder]* to submit a Bid the purpose of which is to provide the following Goods, manufactured by us *[insert name and or brief description of the Goods]*, and to subsequently negotiate and sign the Contract.

We hereby extend our full guarantee and warranty in accordance with Clause 28 of the General Conditions of Contract, with respect to the Goods offered by the above firm.

Signed: [_____]

Name: [_____]

Title: [_____]

Dated on _____ day of _____, _____ *[insert date of signing]*

Form T7 – Code of Conduct & Undertaking

Objective

This Code of Conduct aims to establish PSPC's business and employment practices on the highest standards of ethical behavior, integrity, accountability, courage and excellence.

It also aims to ensure that all concerned adhere to PSPC's defined core values, act with prudence, protect the interests of PSPC and maintain a positive work environment.

Scope

This Code of Conduct is applicable on all PSPC Employees, Contract Employees, Trainees, Apprentices, Deputationist, Outsourced Workforce, and other stakeholders.

General Behavior

The ethical principles of the Corporation prevail over the concerned individual's personal origins, beliefs, values, opinions, preferences, or habits at all times. All concerned, while they are in PSPC's service, shall strictly adhere to the following rules of General Behavior at all times which include, but are not limited to, the following responsibilities:

- 3.1. Comply with all applicable laws, including, but not limited to, those pertaining to general employment, anti-fraud, corruption, bribery, anti-discrimination, anti-harassment, health, safety and environmental protection.
- 3.2. Conduct themselves honestly and carry out their duties diligently and impartially to the best of their abilities, in compliance with the applicable rules, regulations, policies and procedures, as defined by PSPC from time to time.
- 3.3. Maintain highest standards of ethics and professionalism and devote their working activities to the service of PSPC.
- 3.4. Not guarantee or promise employment of any type to anyone for any length of time.
- 3.5. Assist and advise colleagues and show openness and transparency in all dealings with them.
- 3.6. Do not withhold information from concerned colleagues that may affect the conduct of business, particularly in order to gain a personal advantage. Providing false, inaccurate or exaggerated information, refusing to cooperate with colleagues or demonstrating any form of obstructive behavior is strictly not allowed.
- 3.7. Not indulge in any activity during off duty hours that directly or indirectly undermines the provisions of this Code, other PSPC rules, policies and procedures, or brings disrepute to PSPC.

3.8. Refrain from indulging in any illegal and unlawful activity including but not restricted to substance abuse and consumption of alcohol, drugs or any kind of intoxicant(s), as well as, any sort of gambling/betting activities, etc.

3.9. Officers of PSPC performing supervisory functions/roles on behalf of PSPC shall take every possible care to act within the delegated authority as provided by any law, rules or regulations under which such officers may purport to act.

Fraud, Embezzlement & Misrepresentation

4.1. All concerned shall not commit, or assist any activity that involves making false statements, fraud, forgery, misappropriation, theft, embezzlement, bribery, misrepresentation, violation of PSPC rules and regulations, policies and procedures or any similar activity that harms, or may harm the interest and reputation of PSPC.

4.2. Be honest in conveying professional conclusions, opinions, research and findings for whatever purpose and shall not manipulate the system for personal gains.

4.3. Refrain from indulging in any illegal and unlawful activity.

4.4. Abstain from any false or intentionally misleading information and declarations, bogus documents, and submit false or misleading claims with wrong information.

Discrimination and Harassment

5.1. All concerned shall treat all internal and external stakeholders with respect, fairness and courtesy and avoid all such forms of behavior that create or may create an atmosphere of harassment, hostility, intimidation and discrimination of any kind, especially involving age, gender, health, ancestry, physical disability, race, religion, length of service, political beliefs, marital status or family structure.

5.2. Shall not propagate in any manner whatsoever sectarianism, ethnic / regional hatred / animosity and take part in sectarian, ethnic, linguistic or parochial activities, as well as partiality or favoritism on these bases, indulge in nepotism, victimization, willful abuse of power, and unwarranted negative criticism and gossip about other employees.

5.3. Avoid creating / sending / forwarding electronic or any other form of communication that contains statements or material, which is discriminatory, offensive, defamatory, illegal or constituting harassment.

5.4. Refrain from engaging in any form of inappropriate relationship with persons with whom they have a professional relationship.

Confidentiality

6.1. All concerned shall maintain strict confidentiality of PSPC and its constituents affairs and shall not communicate directly or indirectly to their colleague(s) or (ex) employee(s) belonging to other department(s) or profession or to the press or public, any document or information which has come into their possession in the course of their official duties, or has been prepared or collected by them in the course of their duties, whether from official sources or otherwise, unless compelled to do so by judicial or other authority or unless instructed to do so by a superior officer in the discharge of his / her duties.

This confidentiality must be maintained by the employee even after the cessation of their employment with PSPC.

6.2. All concerned shall not give any evidence, document, or any information before a public committee without the prior approval of the Competent Authority.

6.3. Interaction or communication directly or indirectly on behalf of PSPC with foreign governments, media, and missions in Pakistan without seeking clearance from the competent authority is not permissible.

Use of PSPC Assets and Resources

7.1. All concerned are required to use PSPC assets such as properties, office equipment, supplies etc. for PSPC's business purposes and not for gain or benefit of persons or entities other than PSPC, including self.

7.2. Material information such as information contained in any file, document, note, report, letter, fax, USB, email, instrument, etc. held by the concerned must be used solely for the purpose of PSPC business and returned to PSPC upon cessation of employment / contract agreement.

7.3. Official information, documents, reports, proposals, research papers, software, etc. developed using PSPC time and resources constitute PSPC's intellectual property. All concerned will neither have the right to claim these as their own, nor shall they use/exploit the same for personal gain or benefit of persons or entities other than PSPC during or beyond cessation of their employment with PSPC.

Political Affiliation

8.1. No employee of PSPC shall take part in or subscribe in aid of or assist in any way, any political activity / movement in Pakistan or relating to the affairs of Pakistan, or take part in, or in any way assist, any movement or activity, which is, or tends directly or indirectly to be, subversive to Government as by law established in Pakistan or detrimental to the ideology or integrity of Pakistan.

8.2. Employees shall not canvass or otherwise interfere with or use their influence in connection with or take part in any election to a legislative body, whether in Pakistan or elsewhere, provided that an employee who is qualified to vote at such election may exercise their right to vote; but if he/she does so, he/she shall give no indication of the manner in which he/she proposes to vote or has voted.

Attendance and Punctuality

9.1. All concerned shall not leave the office or absent himself / herself from duty, without prior permission of the Competent Authority.

9.2. Strictly adhere to defined break timings, as defined by PSPC from time to time.

Conflict of Interest

10.1. All concerned are required to recognize and disclose activities that might give rise

to conflicts of interest or the perception of conflicts and to ensure that such conflicts are properly managed or avoided. All disclosure should be made at the time the conflict arises, or when it is recognized that a conflict may be perceived, in writing to the supervisor. If the supervisor also has an interest in the matter, the disclosure shall be made to the next higher level of authority.

10.2. While an officer is serving in PSPC, their spouse, children and siblings will henceforth not be eligible for recruitment in PSPC, SBP and/or any of its other subsidiaries.

Gifts and Entertainment

11.1. Except as permitted, employees shall neither receive nor give any gift(s) or favor(s), in cash or any kind, from / to any organization, including those stakeholders (individual, entities or person created by law) who are in contact with PSPC.

11.2. The above instructions will not be applicable in case;

- a. A gift received for value of up to Rs 10,000 provided aggregate value of gifts received / given from / to during a fiscal year from same source does not exceed Rs 20,000;
- b. Advertising materials including trade discounts that an individual or entity normally offers to its general customers;

11.3. The intended recipient will politely refuse the offer of gifts valuing above. However, where such refusal may impact the official relationships, the gift so received would be immediately, but not later than 72 hours, surrendered to HR.

Prohibitions

12.1. Smoking or other use of tobacco products (including, but not limited to, cigarettes, pipes, cigars, electronic Cig, snuff, or chewing tobacco) is not permitted within the office premises. Employees may smoke outside in open air, at the designated areas, without compromising on the working hours.

12.2. Use of any sort of drug including Pan, Gutka, Naswar, etc. within the office premises is not allowed.

Self-Disclosure of Criminal Conviction

All employees are required to self-disclose any criminal offence for which any investigating agency have taken cognizance and for which a conviction has been decided against such an employee by any court of law while being professionally engaged with PSPC irrespective of the nature of engagement.

Health & Safety

All employees must take measures to promote safe working practices, and follow the instructions given by the Health, Safety, and Environment Team from time to time.

Whistleblowing

All concerned are responsible to immediately report any alleged ethical misconduct or fraud. The employees may raise their concerns through a written report or email at whistleblower@pspc.gov.pk. For more information on the applicability of this policy, refer to Whistleblowing Policy.

Compliance with the rules of conduct

Role of line managers

16.1.1. Line managers shall take the necessary measures to encourage respect for the rules of conduct within the entities for which they are responsible.

16.1.2. Managers should ensure that employees placed under their authority are aware of this code.

16.1.3. Apart from the vigilance, line managers are expected to behave in an exemplary manner as regards respect for the principles and rules set out in this code.

16.2. Any information pertaining to violation of this Code must immediately be reported to Director Human Resources.

16.3. If Director Human Resources is found to be violating this Code, MD may be reported. In case of violation by MD, Chairman PSPC may be reported.

Reporting Confidentially

17.1. All stakeholders when reporting to Director HR shall be deemed to have made such report in strict confidence.

17.2. Human Resource Department shall not disclose the identity of concerned employee to other parties unless it is in the interest of the Corporation or it is required by law.

Consequences of Violating the Code

18.1. Any employee who violates the Code shall be subject to disciplinary action.

18.2. Failure to report deviations of the Code by all concerned may result in disciplinary action. Similarly, failure to report deviations of the Code by other stakeholders may result in the termination of their relationship with the Corporation.

Interpretation

This policy shall supersede all previous policies on the subject. In case of any ambiguity in understanding this Policy, the interpretation of the Managing Director will be treated as final. Any exception to the policy shall be approved by the Managing Director on the recommendation of Director HR and shall be reported to Board Human Resource Committee for ratification.

Undertaking for Compliance with Code of Conduct**Bidder Name:** _____**Bidder Representative (If any):** _____**Date:** _____

I, the undersigned, on behalf of [Bidder Company Name], hereby acknowledge that I have received, read, and understood the Code of Conduct established by [Procuring Agency Name].

As a bidder participating in the procurement process, I undertake to:

1. Adhere to the highest standards of integrity and professionalism in all interactions with PSPC
2. Ensure that all communications and representations made during the bidding process are truthful and transparent.
3. Comply with all applicable laws, regulations, and policies outlined in the Code of Conduct.
4. Avoid any conflicts of interest and disclose any potential conflicts promptly.
5. Report any unethical behavior or violations of the Code of Conduct to the appropriate authorities within PSPC.

I understand that any breach of this undertaking or the Code of Conduct may result in disqualification from the bidding process and potential legal consequences.

Authorized Signature: _____**Date:** _____

Undertaking for Compliance with Health, Safety & Environment (HSE) Policy of PSPC

Bidder Name: _____

Bidder Representative (If any): _____

Date: _____

As a bidder participating in the procurement process, I undertake to comply with all applicable HSE laws, regulations and industry standards; and with all following HSE requirements of PSPC:

1. Suppliers / Contractors are responsible for the health, safety and well-being of their employees. The contractors will also be responsible to provide relevant personal protective equipment (PPEs) to their workforce where required.
2. Suppliers / Contractors who have their own HSE management system, shall provide details of the same on request.
3. The contractor / suppliers must take all necessary safety precautions related to the performance of contract in order to protect all worksites, including all personnel and property of the PSPC, the contractor, all third parties and the communities.
4. Contractor shall ensure that all personnel are adequately trained & skilled to perform the task assigned.
5. Supplier / Contractor shall ensure compliance with PSPC policies, procedures and applicable legal and regulatory requirements after award of contract and during execution. These policies and procedures can be obtained upon request from Purchase Department.
6. Contractor shall adhere to set standards and requirements for environmental protection.

I, the undersigned, on behalf of [Bidder Company Name], hereby acknowledge that I have received, read, and understood the HSE requirements of PSPC.

Authorized Signature: _____

Date: _____

(FORM - T8) NON-DISCLOSURE AGREEMENT (NDA)**Rs. 500/- Stamp Paper Print**

P.O.#: _____

NON-DISCLOSURE AGREEMENT (NDA)

This agreement is entered into as of day of..... Year

between

Pakistan Security Printing Corporation (Pvt.) Limited, Manufacturer of Banknotes and Prize Bonds registered under the laws of Pakistan, having its registered office at Jinnah Avenue Malir Halt, Karachi, through its authorized representative _____ (hereinafter referred to as '**PSPC**', which expression, where the context so requires and permits, shall mean and include its successors-in-interest, administrators, executors, legal representatives and permitted assigns);

and

_____, having its registered office at through its authorized representative (hereinafter referred to as '.....' which expression, where the context so requires and permits, shall mean and include its successors-in-interest, administrators, executors, legal representatives and permitted assigns).

(PSPC and _____ are hereinafter collectively referred to as the "Parties" and individually as a "Party").

'Agreement' means this Agreement and all written amendments and revisions made thereto from time to time.

"Effective Date" means the date of execution of this Agreement.

'State' means the territory of the Islamic Republic of Pakistan.

WHEREAS

The Parties to this Agreement wishes to enter into an Agreement concerning the disclosure of certain proprietary and confidential information, whereby it will be necessary for each party (the "**Disclosing Party**") to disclose to the other Party (the "**Receiving Party**"), as the case may, information of a confidential or proprietary nature for the purposes as defined in the Agreement (**Authorized Purpose**) (irrespective of the form of presentation or communication including, but not limited to data, notes, analyses, compilations, studies, physical objects, samples, financial information, technical information, cost information, techniques, , material, methods, processes, sources and any other information, however, described, which is or could be valuable in the type of business in which Disclosing Party is engaged) provided that any disclosure of information made in writing shall be marked confidential or with words of similar effect and that any disclosure made orally shall subsequently be reduced to writing by the Disclosing Party and marked confidential or with words of similar effect with a copy sent to the Receiving Party within 30 days of disclosure ("Information").

IT IS AGREED AS FOLLOWS:

1. This Agreement will apply to any disclosure of Information on the Effective Date. This Agreement may be terminated by any Party after giving a prior notice of 30 (Thirty) days' in writing; or immediately if the Disclosing Party has reason to believe that the Receiving Party is in breach of any of the obligations contained herein. Such termination shall not affect any obligation imposed by this Agreement with respect to Information received prior to such termination.
2. Receiving Party shall hold and protect the Confidential Information in the same manner as it protects its own confidential information and in any event such protection shall not be less than that which a reasonable person or business would take in protecting its own confidential information; and shall use the Confidential Information for the sole and exclusive benefit of the Disclosing Party. Receiving Party shall carefully restrict access to Confidential Information and only disclose Information on a need-to-know basis to such of its employees, contractors, agents, representatives and consultants as is reasonably required, and are under similar obligations of confidentiality as contained in this Agreement, the use whereof shall be restricted for Authorized Purpose only.

Receiving Party shall not, without the prior written approval of the Disclosing Party, use publish, copy, or otherwise disclose the Confidential Information to others, or permit the use by others for any purpose other than the Authorized Purpose. Receiving Party shall, forthwith upon receipt of a written request from the Disclosing Party or on termination:

- (i) return all information supplied by the Disclosing Party as well as items and materials relating to or derived from the Information;
 - (ii) deliver to the Disclosing Party or at its request destroy immediately all items and materials made by the Receiving Party containing Information, that are not returned pursuant to paragraph (i) above;
 - (iii) not keep copies or duplicates of any items or materials referred to in paragraphs (i) or (ii) above; and
 - (iv) provide a certificate signed by a senior officer of the Receiving Party confirming that the provisions of this clause have been complied with.
3. This Agreement shall not apply to any Information which the Receiving Party: (a) can show is or becomes publicly available through no fault of the Receiving Party; (b) can show was in its possession prior to the date of disclosure; (c) may subsequently receive from any third party legally in possession of the Information and who was not restricted from disclosing it; (d) can show is independently acquired by the Receiving Party as a result of work carried out by an employee, consultant or contractor of the Receiving Party to whom no disclosure of Information has been made; or (e) is required to disclose pursuant to a court order or any law/rules/regulations provided that the Receiving Party shall have given prior written notice to the Disclosing Party.
 4. This Agreement shall not be deemed to confer or imply the grant or agreement to grant by the Disclosing Party to the Receiving Parties of any of its rights under copyright, patents, trademarks, design rights or other similar rights. All Information supplied hereunder is supplied on an "as is" basis and the Disclosing Party gives no representation or warranty as to its accuracy, completeness or fitness for any purpose other than the Authorized Purpose. The Disclosing Party shall not be liable for any loss or damage suffered by the Receiving Parties as a result of any Receiving Party's use of the Information.

5. This Agreement does not create any agency or partnership relationship and each party shall act as an independent entity. This Agreement will not be assignable or transferable by the Parties. All additions or modifications to this Agreement must be made in writing and signed by the Parties.
6. Notices shall be delivered personally, or by prepaid first class mail, or transmitted by facsimile to the Parties at such address or number as the parties shall specify from time to time.
7. The Receiving party may obtain consent of the Disclosing party for any waiver of rights, to share information received under this Agreement to a third party for the Authorized Purpose. Any waiver of any right under this Agreement is only effective if it is in writing and applies to the specific circumstance for which it has been given.
8. In the event of a breach, Disclosing Party shall be entitled, in addition to any other remedies and damages available at law or in equity, to an injunction to restrain the violation thereof by Receiving Party, or its employees, contractors, agents, representatives and consultants ,
9. This Agreement shall be governed by and shall be construed in accordance with the laws of Pakistan. In case a dispute arises between the Parties with regard to the terms of or rights and obligations of the Parties under this Agreement, if not resolved amicably, shall be referred to the arbitrator to be mutually appointed by the Parties. The arbitration shall be carried out in accordance with the Arbitration Act, 1940 in English. The award shall be conclusive, and binding on the Parties and the Parties submit to the non-exclusive jurisdiction of the Pakistan's Courts.

In WITNESS WHEREOF, the parties have executed this Agreement and shall be effective as of the date first above written.

For and on behalf of
Pakistan Security Printing Corporation

For and on behalf of

This Agreement has been executed in the presence of the following witnesses:

1. Full Name: _____
Address: _____
Signature: _____
CNIC No: _____
2. Full Name: _____
Address: _____
Signature: _____
CNIC No: _____

FINANCIAL PROPOSAL FORMS

Form F1 – Letter of Bid (Financial Proposal)

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

Place this Letter of Bid - Financial Proposal in the second envelope marked "FINANCIAL PROPOSAL".

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

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

Date of this Bid submission: May 21, 2026

Invitation No: LP/T-4110/26/FA

Name of Project: Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment

To: *[Pakistan Security Printing Corporation (Pvt.) Ltd]*

We, the undersigned Bidder, hereby submit the second part of our Bid, the Financial Proposal

In submitting our Financial Proposal, we make the following additional declarations:

- (a) **Bid Validity Period:** Our Bid shall be valid for the period specified in BDS 17.1 (as amended, if applicable) from the date fixed for the bid submission deadline specified in BDS 23.1 (as amended, if applicable), and it shall remain binding upon us and may be accepted at any time before the expiration of that period;
- (b) **Total Price:** The total price of our Bid, excluding any discounts offered in item (c) below is:

In case of only one lot, the total price of the Bid is [insert the total price of the bid in words and figures, indicating the various amounts and the respective currencies];

In case of multiple lots, the total price of each lot is [insert the total price of each lot in words and figures, indicating the various amounts and the respective currencies];

In case of multiple lots, total price of all lots (sum of all lots) [insert the total price of all lots in words and figures, indicating the various amounts and the respective currencies];

- (c) **Discounts:** The discounts offered and the methodology for their application are: **NOT APPLICABLE**

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

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

- (d) **Commissions, gratuities and fees:** We have paid, or will pay the following commissions,

gratuities, or fees with respect to the bidding process or execution of the Contract: *[insert complete name of each Recipient, its full address, the reason for which each commission or gratuity was paid and the amount and currency of each such commission or gratuity]*.

Name of Recipient	Address	Reason	Amount

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

- (e) **Binding Contract:** We understand that this Bid, together with our Purchase Order shall constitute a binding contract between us, until a formal contract is prepared and executed.

Name of the Bidder: **[insert complete name of the Bidder]*

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

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

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

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

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

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

Form F2 – Form of Bid Security (Bank Guarantee)

[The bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]

[Guarantor letterhead or SWIFT identifier code]

Beneficiary: *Pakistan Security Printing Corporation (Pvt.) Ltd*

Invitation No: *LP/T-4110/26/FA*

Date: *[Insert date of issue]*

BID GUARANTEE No.: *[Insert guarantee reference number]*

Guarantor: *[Insert name and address of place of issue, unless indicated in the letterhead]*

We have been informed that _____ *[insert name of the Bidder, which in the case of a joint venture shall be the name of the joint venture (whether legally constituted or prospective) or the names of all members thereof]* (hereinafter called "the Applicant") has submitted or will submit to the Beneficiary its Bid (hereinafter called "the Bid") for the execution of _____ under Request for Bids No. _____ ("the RFB").

Furthermore, we understand that, according to the Beneficiary's conditions, Bids must be supported by a Bid guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of _____ (_____) upon receipt by us of the Beneficiary's complying demand, supported by the Beneficiary's statement, whether in the demand itself or a separate signed document accompanying or identifying the demand, stating that either the Applicant:

- (a) has withdrawn its Bid during the period of Bid validity set forth in the Applicant's Letter of Bid ("the Bid Validity Period"), or any extension thereto provided by the Applicant; or
- (b) having been notified of the acceptance of its Bid by the Beneficiary during the Bid Validity Period or any extension thereto provided by the Applicant, (i) has failed to sign the contract agreement, or (ii) has failed to furnish the performance security, in accordance with the Instructions to Bidders ("ITB") of the Beneficiary's bidding document.

This guarantee will expire: (a) if the Applicant is the successful Bidder, upon our receipt of copies of the Contract agreement signed by the Applicant and the performance security issued to the Beneficiary in relation to such Contract agreement; or (b) if the Applicant is not the successful Bidder, upon the earlier of (i) our receipt of a copy of the Beneficiary's notification to the Applicant of the results of the Bidding process; or (ii) twenty-eight days after the end of the Bid Validity Period.

Consequently, any demand for payment under this guarantee must be received by us at the office indicated above on or before that date.

[Signature(s)]

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



PSPC N-1 GATE

ALLIED WORKS AT MALIR, KARACHI
Structure Works

Bill of Quantities
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Form F3 – Price Schedule

Invitation

LP/T-4110/26/FA

No:

Title:

Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment

Bidder:

[Manager]

Below mentioned services & supplies will be as per technical specification given in Section V- Technical Specification. All prices must be in Pak Rupee. All the quotes must be provided as per detailed component wise format specified in the BOQ part of this document and can be summarized as below.

S.NO	ITEM DESCRIPTION	Total Amount
1	Structure Works	
2	Civil / Interior Finishes & External Development Works	
3	HVAC Works	
4	Plumbing Works	
5	Electrical & Security Equipment's	
TOTAL AMOUNT WITHOUT TAXES		
TOTAL AMOUNT WITH 8% TAXES		

Total Amount with tax in words: _____



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Note:

- i. *Prices should be inclusive of all applicable taxes and duties in Pakistan.*
 - ii. *Before filling this form kindly read the required Technical Specifications in Section V.*
 - iii. *The prices should include the price of incidental services. No separate payment shall be made for the incidental services*
-

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ALLIED WORKS AT MALIR, KARACHI
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S. No.	Description	Quantity		Rate	Unit	Amount
01.	SITE LEVELING, EXCAVATION, FILL, BACKFILL & ANTI-TERMITE TREATMENT:					
101	Excavation in foundations and trenches in all kinds of soils including all operations of dewatering, leveling, dressing and ramming the excavated surface and throwing earth clear of edges of excavation and stock piling, filling the excavated stuff in 6" layers in excavated pits, depressions, underfloor or where required to and from complete with breaking clods and mechanically compacting to 95% AASHO dry density with a distance of 150 feet all complete as per drawings and specifications including disposal of surplus excavation stuff from site of work or as directed by the Engineer In charge:	4,000	Cft		Cft	
102	Earth work in filling with new earth (excavated from outside) in plinth or depression or under floor including all leads and lifts levelling, clod breaking, dressing, watering, consolidating by ramming in layers not exceeding 6 inches in thickness and mechanically compacting to 95% AASHO dry density etc.; complete.	2,500	Cft		Cft	
103	Providing and performing anti termite treatment by spraying/ sprinkling/spreading the chemical Dursban TC or approved equivalent to be mixed with water in ratio of 1:6 to make the concentration 1.6%. In case of new work, the treatment will be carried out in 3 repeated operations. First operation @ 5 liters of chemical per sq. m. to be sprinkled on the bottom surface of the excavated trenches and their sides. Second operation @ 5 liters of the chemical per sq. m. when the structure reaches up to GROUND LEVEL and final application with the same ratio will be given on top of back filled earth under floor and around the building. In case when the base concrete of floor is laid in place of first two operations the chemical will be injected on both sides of the walls by making holes at 1'-0" C/C to the maximum saturation at least 3 times and the final application will be applied on top of the base concrete @ 5 liters per sq.m (Note: Payment will be made for the plinth area of the building for all applications as mentioned in the nomenclature).	2,500	SFT		SFT	
104.	Providing and laying 9"/6" thick stone soling of approved quality stone ballast, under Foundation pads & floors and					



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	wherever required, consolidating and compacting etc. complete:	2,500	Cft		Cft	
105.	Providing and applying 2 coats of cold-applied emulsified bitumen paint (approved make) of total dry film thickness not less than 1.5mm, on all exposed imbedded concrete surfaces (ie., in contact with earth), including cleaning of surface, and applying primer coat, complete as per direction of Engineer-in-charge.	2,500	Sft		Sft	
02.	CONCRETE PLAIN AND REINFORCED.					
201	Providing and laying C.C. 1:4:8 bed floor over stone soling, using approved quality fine and coarse aggregate including compacting leveling, consolidating finishing and curing etc.; complete:	2,800	Cft		Cft	

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S. No.	Description	Quantity		Rate	Unit	Amount
202	Providing and Laying 1:3:6 cast in situ in foundation, having Fcu= 1500 psi, plinth and wherever required using approved quality fine and coarse aggregate of crushed stone passing 3/4" sieve including form work as per drawing and design, leveling, compacting, rodding, vibrating, and curing etc; complete.	800	Cft		Cft	
203.	Providing and laying RCC of specified strength using approved quality crushed stone and fine aggregate in foundation, columns, beams, lintels, roof slab, chajjas, purdi, staircase (waist slab, steps, landing) and any other structural member including all kind of forms, moulds, lifting, shuttering, leveling compacting, rodding, vibrating, finishing, curing etc; complete as per drawings and specifications and as directed by the Engineer Incharge (excluding the cost of steel and its fabrication).					
	a). RCC 1:1.5:3 -Grade B (Fcu = 3750 psi)					
	i) Foundation Pads	1,900	Cft		Cft	
	ii) columns	2,950	Cft		Cft	
	iv) Hollow Core Roof Slab	6,000	Cft		Cft	
	b). RCC 1:2:4 -Grade C (Fcu 3000 psi)					
	i) Slabs, Beams , lintels, pardi, Stairs & Landings.	3,950	Cft		Cft	
204.	Construction of in-situ RCC foundation for street light pole as per drawing inclusive of excavation, preparation of subgrade, lean concrete bed, backfill and fixing of 4 nos - J-bolt 3/4" dia. x 24", complete in all respect.	25	No		No	
03	STEEL REINFORCEMENT & METAL WORK.					
301.	Providing and Laying reinforcement of ribbed deformed steel bars of minimum yield stress of 60,000 psi of approved manufacturers including straightening, cutting, bending, removing of rust from bars, including wastage and overlaps as are not shown on drawings placing in position on precast CC spacers tying with binding wire complete with cost of steel chairs and binding wire etc; [NOTE: No extra allowance will be allowed for wastage, oversize and steel chairs, as well as steel will made by new billet]:	60,000	kg		kg	
302.	Provision, fabrication & installation of specified steel sections as per design & drawings including cutting, welding & all temporary works and arrangement for the successful accomplishment of	2,000	kg		kg	



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	works with safety.					
04.	ROAD & PAVEMENT WORK					
401.	Subgrade preparation: Compaction of existing natural ground/ subgrade by scarring, watering, rolling with power roller to achieve 95% modified AASHTO density, to the required, depth (12") & level, & site clearance /removal & disposal of unwanted material as per direction of Engineer in-charge	24,000	Sft		Sft	
402.	Providing, laying, spreading, and compacting granular sub-base of specified thickness 6", using suitable material (crushed stone, gravel) in layers, including watering, mixing, and grading with a motor grader to achieve minimum 98% modified ASSHTO density.	24,000	Sft		Sft	

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S. No.	Description	Quantity		Rate	Unit	Amount
403.	Providing and laying Aggregate Base Course (ABC) of 6" thickness, conforming to NHA, with crushed stone aggregate of approved quality, including screening, mixing, spreading to proper grade/camber, and compaction to 100% maximum modified AASHTO density, using suitable equipment, complete in all respects."	24,000	Sft		Sft	
404.	Providing and applying prime coat with Medium Curing (MC) cutback bitumen @ 0.6 to 1.0 kg/sqm on prepared granular base, inclusive of cleaning, mechanical spraying, and incidental costs	24,000	Sft		Sft	
405.	Providing and laying plant-premixed bituminous carpet at project site, including compaction and finishing to required camber, grade, thickness, and density complete in all respects as per drawings, specifications and instructions of the Engineer In-charge (2" thickness)".	24,000	Sft		Sft	
406.	Providing and laying factory made concrete paver blocks of M-25 grade (or M-40) and 60mm/80mm thickness of approved color, shape, and design, with a 50mm thick compacted sand bed over 6" th. compacted granular sub-base layer (inclusive of subgrade preparation), & also including filling of joints with sand/filler and compacting with plate vibrator, all complete as per technical specifications and direction of Engineer-in-Charge."					
	1- Parking & road ways -80 mm th, minimum M-40 grade (7000 psi)	11,400	Sft		Sft	
	2- Walkways & pedestrian traffic - 60mm th. , M25 grade (4000 psi)	6,000	Sft		Sft	
407.	Providing and laying precast concrete kerb / edge block (Grade B) on prepared minimum 4" th. CC bed & backing, inclusive of subgrade preparation , levelling & compacting and fixing in alignment , backfill and jointing with CS 1:3 mortar. Complete in all respect.	2,000	Rft		Rft	
TOTAL AMOUNT OF STRUCTURE WORKS					Rs	-

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S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
1	DISMANTLING WORK			
	Dismantling and removing of existing Block masonry, columns, beams, slabs shrubs, debris and chiseling of plaster (where required), scaffoldings & all material etc. including tools and equipment's, all necessary precautionary measures or any other item which is require to be reuse will be removed meticulously, cleaning of site carting away surplus stuff etc. from site complete in all respect. Note: Contractor must visit the site for clarity of scope of works, before quoting rates, no claims over & above quoted amount will be paid, must be shift, clear & disposal of all debris from site to any lead & retaining designated material by contractor as directed by the Architect / Owner.			
1.1	Existing block masonry	6600 Sft		
1.2	Existing columns	1100 Sft		
1.3	Existing beams	825 Sft		
1.4	Existing slabs	550 Sft		
1.5	Existing Debris removing	1 Job		
1.6	Shrubs removing	1 Job		
2	BLOCK MASONRY WORKS			
	Providing & Laying any size solid block masonry at any level and height using machine made blocks having 1000 psi strength @ 28 days without broken edges using minimum 1/2" wide mortar joints both horizontally and vertically in cement sand mortar 1:4 with raking of joints from both the sides, the Job includes Two 3/8" Dia steel bars of 2'-0" length on both sides of wall at every 2'-0" height for anchoring of masonry into RCC			

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	columns and walls, making openings for doors, windows and others, making chases for services and electrical conduits / pipes, hacking of existing surface for bonding where necessary along with curing, scaffolding, wastages, forming control joints etc. Complete in all respect as per drawing and as instructed by the Architect.			
2.1	6" Thick block masonry	18225 Sft		
2.2	4" Thick block masonry	2015 Sft		
2.3	Bracing Beam (Size as per requirement)	50 Rft		
2.4	RCC lintel (Size as per requirement)	50 Rft		
3	PLASTER WORKS			
	Providing and applying of 1:4 cement sand plaster 1/2" ~ 3/4" thick at any height on internal and external surface of slab, walls, columns, beams, doors and windows jambs using best quality O.P.C, including 8 inches wide galvanized metal lathe of 18 gauge at joints of structure with block masonry, conduit chases, grooves where required, smooth trowel finish in line, level, plumb along with curing, scaffolding, chiseling, filling of cracks, hacking / chipping of existing surface for bonding where necessary, wastage, etc., complete in all respect as per Architect's satisfaction.			
3.1	Internal Plaster	31568 Sft		
3.2	External Plaster	23756 Sft		
3.3	Pudlo Plaster 3/4" ~ 1" (tanks)	675 Sft		

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S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
4	FAIR FACE PLASTER			
	Providing and applying 3/8" thick fair face cement sand plaster (White + Grey cement) in approved ratio on external surface with 5/8" thick rough base plaster, including grooves making same as existing building, in line, level, plumb, curing, scaffolding, hacking / chipping of existing surface for bonding where necessary, wastage, etc, complete in all respect, grooves where required, smooth trowel finish in line, complete in all respect as per Architect's satisfaction.			
4.1	Fair Face Plaster	6300 Sft		
5	CEMENT CONCRETE FLOOR			
	Providing, laying, average 1½" ~ 2" thick Flooring (1:2:4) of 2000 psi compressive strength under any type of flooring using best Quality O.P.C and local approved quality sand and crushed stone, with necessary arrangements where required excluding base of tiles complete in all respects as per approval of Architect.	4604 Sft		
6	CEMENT CONCRETE RAISED FLOOR			
	Providing and laying given size of cement concrete raised floor in the ratio of 1:3:6 (1 - Cement, 3 - Sand & 6 - Aggregate) having 1400 psi compressive strength, using best quality of Ordinary Portland Cement (OPC), local approved quality sand and crushed stone, with necessary arrangements where required excluding base of tiles and wastages etc. Complete in all respects as shown in drawing and as directed by the Architect.			
6.1	8" thick (toilet area)	213 Sft		
6.2	4" thick (Pantry area)	198 Sft		

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7	WATER-PROOFING			
7.1	Providing & applying polymer-modified asphaltic waterproof coating (Noor chemical or BASF) for pantry, toilet floor & wall. Complete in all respect as per drawing, specifications and directed by the Architect.	2000 Sft		
7.2	Providing & laying RL-400, 4 mm thick HDPE finish waterproofing membrane system on Sub structure along with prior cleaning , free of dust and extra concrete before applying primer on the prepared surface. Complete in all respect as per drawing, specifications and directed by the Architect.	1500 Sft		
7.3	Providing & laying RLG-400, 4 mm thick granular finish waterproofing membrane system on roof along with prior cleaning , free of dust and extra concrete before applying primer on the prepared roof surface. Complete in all respect as per drawing, specifications and directed by the Architect.	2304 Sft		
8	M.D.F BOARD PARTITION CABIN			
	Provide and fix in position full-height partition 4-inch thick consisting of 1/2" thick MDF board sheet screwed to both sides of the partial wood framework and including the cost of three coats of approved shade of paintwork, making grooves at sheet joints, cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect. NOTE: Use MDF board, such as ZRK or an approved equivalent. The filling, primer, putty, and paint are used by Kansai / Jotun or the approved equivalent.	1 Job		

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S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
9	PORCELAIN TILE ON FLOOR			
	Providing and Laying of full body Porcelain Tiles Flooring consisting of cut to size (as per drawing) with approved quality of dry bond on already laid cement concrete floor, chipping / chiseling of existing floor (if required) to maintain level, setting the tiles with neat and clean, 1mm to 3mm groove filled with approved water proof grout as per thickness, specifications & instructions according to design and pattern including floor tile skirting, protect / cover tile, curing, cleaning, wastages and cartage etc. Complete in all respect as shown in drawing, details and as directed by the Architect. Use Dry Bond: Recesschem or approved equivalent. Use Grout: Recesschem / S.tiles or approved equivalent			
9.1	Mat Tile Size for G.F Toilet Lobby: 2' - 0" x 2' - 0"	120 Sft		
9.2	Mat Tile Size for Balcony, store, lobby, passage and pantry: 2' - 0" x 2' - 0"	594 Sft		
9.3	Mat Tile Size for Toilet: 2' - 0" x 2' - 0"	405 Sft		
9.4	Ceramic Tile for Janitorial, Pantry base cabinet 8" x 8"	99 Sft		
9.5	Ceramic Tile for tanks floor 8" x 8"	198 Sft		
10	PORCELAIN TILE ON WALL			
	Providing and Laying of full body Porcelain Tiles on wall with approved quality of Dry bond on RCC or masonry walls, placing the tile with 3mm groove filled with approved water proof grout as per thickness specifications & instructions, as per design and pattern including stainless steel bar drilled into the center of tile and tie from wall and fill the area with epoxy, protect / cover tile, curing, cleaning, hacking / chipping of existing surface for bonding where necessary, tile spacer,			

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	wastages and all equipment etc. Complete in all respect as per drawing, details and as directed by the Architect. Use Dry Bond: Ressichem or approved equivalent			
10.1	Polished Porcelain Tile Size for Pantry: 2' - 0" x 2' - 0"	40 Sft		
10.2	Polished Porcelain Tile Size for Toilet: 2' - 0" x 2' - 0"	2277 Sft		
10.3	Ceramic Tile for tanks wall 8" x 8"	540 Sft		
11	GYPSON BOARD SUSPENDED CEILING			
	Providing and installation of suspended ceiling consisting of 12mm thick gypsum board with approved shade of Matt Enamel paint and galvanized iron framework, suspension adjustable clutch wire hanging system, including ¼" x ¼" aluminum U channel at edges of the ceiling, cutting opening for light fixtures, light pelmet, slits, fiber tape on joints, A/C diffusers, A/C access panels wastage, hardware, scaffolding, lifting, etc. Complete in all respects conforming to the requirement of the drawing and as directed by the Architect. Gypsum Board : Elephant Brand / DFB or approved equivalent. Paint Work : Kansai / Jotun or approved equivalent. Note: In the process of billing only length and breadth will be measure.	800 Sft		
12	PRE-POLISHED GRANITE			

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	Provide and lay 3/4" thick pre-polished (grey) granite with bullnose edges of the approved sample over tread and riser for stairs steps, external steps, internal steps planter wall, bench, ramp, and sill with 1:4 cement sand mortar base of required thickness to achieve a minimum overall finished floor thickness of approximately 2", setting the granite with neat cement mortar, grouting the butt joints approved color of waterproof grouting (by Ressichem or approved equivalent) including 1/8" thick "V" grooves over steps, curing, cleaning, chipping, hacking of existing surface for bonding where necessary, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by the Architect.			

S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
12.1	G.F Waiting Area, F.F conference, meeting rooms & lobby: 2' - 0" x 2" - 0"	3769 Sft		
12.2	Entrance & Exit	257 Sft		
12.3	Staircase	371 Sft		
12.4	Window Sill	95 Sft		
13	FLAMED GRANITE			
	Provide and lay 3/4" thick flamed (grey) granite of the approved sample over ramp with 1:4 cement sand mortar base of required thickness to achieve a minimum overall finished floor thickness of approximately 2", setting the granite with neat cement mortar, grouting the butt joints approved color of waterproof grouting (by Ressichem or approved equivalent) including 1/8" thick "V" grooves over steps, curing, cleaning, chipping, hacking of existing surface for bonding where necessary, cutting, lifting and wastages etc. Complete in all respects as shown in			

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	the drawing and directed by the Architect.			
13.1	Ramp	176 Sft		
14	STAINLESS STEEL RAILING			
	Providing, fabricating and fixing in position 3'-0" high stair railing comprising of 3"x1"x16 SWG ellipse (Non magnet Grade 304) stainless steel pipe hand rail, 1/2" dia SS balustrade and 2" x 8mm top & middle 1/2" dia. stainless steel solid bars horizontally (3 No.), including cost of base plate, rawal bolts, rawal plugs, R.c.c cutting (if required), welding, polishing, and fixing to staircases/Ramp, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by the Architect.			
14.1	Entrance & Exit Area	20 Rft		
14.2	Staircase	25 Rft		
14.3	Ramp	74 Rft		
15	SOLID WOODEN MOLDING			
	Provide, make, and install 3/4" x 3/4" thick solid wood molding nailed on the wall at the top edge of the wall tile having an approved shade of paint finish, including pencil round edges on both sides, groove, cutting, lifting, shifting cartages, wastage, all necessary hardware and material used for fixing, etc. Complete in all respects as shown in the drawing and directed by the Architect.	86 Rft		
16	CURTAIN WORK			
	Supply & install white sheer curtains on position consisting with triple pinch pleat, hung on single-track rail, dimensions, cutting, lifting, shifting,			

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	scaffolding, all hardware and material use for fabrication and wastages etc. Complete in all respect as shown in drawing and as directed by the Architect.	297 Sft		
17	FIXED GLAZING			
	Provide and install glazing on position consisting of 12mm thick clear tempered glass with machine polished finish edges fixed with approved quality of 4" x 2" x 2mm thick charcoal gray finish aluminum frame including approved quality of rubber gasket seal, silicone sealant, cutting, lifting, shifting cartages, scaffolding, wastage, all necessary hardware and material use for fixing etc. Complete in all respect as shown in drawing and as directed by the Architect. Use Aluminum Frame, by Pak-Cables, Prime, Chawla or approved equivalent	396 Sft		

S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
18	MAIN WOODEN DOORS			
18.1	Providing, making, and installing wooden doors, consisting of 1½" thick solid core flush shutter with an approved 3.2mm thick lamination board (Formite / Al-Noor or equivalent) pasted on both sides of 1/8" thick commercial ply including partial wood in-fill framing, 1/4" thick solid oak wood lipping on edges and 2" x 4" solid mahogany wood frame with patam having an approved shade of polish work, all necessary hardware such as heavy-duty stainless steel ball-bearing hinge, lockset, handle, push plate, glue, wastages, lifting, cutting, door cut stopper, door closer, etc. Complete in all respects as shown in the drawing			

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	and directed by the Architect.			
	Door size is 3' - 3" x 8'-0" (Rooms)	13 Nos		
19	TOILET DOORS WITH WOODEN FRAME			
	Providing, making, and installing wooden doors, consisting of 1½" thick solid core flush shutter with an approved 3.2mm thick lamination board (Formite / Al-Noor or equivalent) pasted on both sides of 1/8" thick commercial ply including partial wood in-fill framing, 1/4" thick solid oak wood lipping on edges and 2" x 4" solid mahogany wood frame with patam having an approved shade of polish work, all necessary hardware such as heavy-duty stainless steel ball-bearing hinge, lockset, handle, push plate, glue, wastages, lifting, cutting, door cut stopper, door closer, etc. Complete in all respects as shown in the drawing and directed by the Architect.			
	Door size is 3' - 0" x 7'-10" (Toilets)	7 Nos		
20	GLASS DOORS			
	Provide and install a 12mm thick clear tempered glass frameless door with machine-polished edges, including an approved heavy-duty Stainless steel patch fitting and floor hinge, a long handle (approved) on both sides of the door leaf, including lifting, shifting, and wastage with fixing arrangements, all necessary hardware and material, etc. Complete in all respects as shown on the drawing and directed by the Architect.			
20.1	Entrance and Exit Glass Door	2 Nos		
20.2	Conference Glass Door	1 Nos		
20.3	Meeting Room Glass Door	2 Nos		

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21	EMERGENCY DOORS			
	Provide and fix metal steel fire-rated panic-bar door based on 90 minutes fire retardant consisting of metal steel pressed sheet panel having fire-rated epoxy-based sigma cover 620 and finished with top coat of paint (Jotun / Kansai or approved equivalent), Rock Wool of 80 density in-between metal steel pressed sheet panel along with 22mm thick double glazed safety glass vision panel including 4" thick door frame fixed with galvanized anchor bolt, smoke seal, door closer, stainless steel hinges, an approved sample of handle lock, lifting, shifting and all necessary material complete in all respect as per manufacturer's specification. SOURCE: Khambati's Furniture, Gujrat Steel, or approved equivalent.	1 Nos		
22	MILD STEEL DOORS			
	Provide, fabricate & Install metal door consisting of 1-1/2" x 2" (16 SWG) M.S. main frame with 1-1/4" x 1-1/4" x 1/8" thick M.S. angle shutter with M.S. sheet (18 SWG) wrapped on it, 4" long M.S flat hold fast including two coats of anti rust paint and three coats of approved shade of paint, panic bar locking system and all necessary hardware & material use for fabrication etc., Complete in all respect as shown on drawing, hardware schedule & as directed by the Architect.	3 Nos		

S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
23	DOCUMENTATION STORAGE BOX			

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	Provide and fix in a position of low-height storage box for documentation consisting of 3/4" thick MDF sheet screwed to 1"x1" metal framework including the cost of three coats of Matt Enamel paint finish, making grooves at sheet joints (where required), cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	2 Nos		
24	SEATING BENCH			
	Provide, make, and install a bench consisting of 1:2:4 concrete, and applying of 1:4 cement sand plaster 1/2" ~ 3/4" thick on internal and external surface of seat using best quality O.P.C, where required, smooth trowel finish in line, level, plumb along with curing, chiseling, filling of cracks, hacking / chipping of existing surface for bonding where necessary, wastage, etc., complete in all respect as per Architect's satisfaction.	1 Job		
25	M.S STAIRCASE WITH HANDRAIL			
	Providing, making and fixing M.S. Staircase with M.S steps including, 2" dia M.S pipe over 1/2" M.S shaft, 3/8" dia M.S pipe (3 Nos) horizontally, 3/8" thick M.S sheet, 1½" x 1½" dia M.S pipe hand railing comprising of mild steel bar vertically finished with paint of approved shade, complete as shown on drawing # AD - 06 and as directed by the Architect. All the pipes are welded to each others, inclusive of approved shade of spray paint work after applying anti rust paint. Includes mild steel base plates, cover plates, dash fasteners, welding, and fixing to staircases/balconies, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by	36 Rft		

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	the Architect. Note: In the process of billing counter will be measure from actual size of top length only.			
26	MARBLE ON STAIRCASE			
	Providing and laying Marble using best approved quality marble in required sizes laid over base of 2" thick c.c. bed, including white cement sullary with levelling, curing, grinding and polishing. Complete in all respect as shown in drawing and as directed by the Architect.	183.6 Sft		
27	MILD STEEL RAILING			
	Providing, fabricate & fixing M.S. railing in consisting of 2" dia M.S pipe over 1/2" M.S shaft, 3/8" dia M.S pipe (3 Nos) horizontally, 3/8" thick M.S sheet, 1½" x 1½" dia M.S pipe hand railing, including Fully welded joints, with no sharp edges, All the pipes are welded to each others, inclusive of approved shade of spray paint work after applying anti rust paint. Includes mild steel base plates, cover plates, dash fasteners, welding, and fixing to staircases/balconies, cutting, lifting and wastages etc. Complete in all respects as shown in the drawing and directed by the Architect.			
	Staircase	25.2 Rft		
	Balcony	18 Rft		
	Control room and Watch towers	76.5 Rft		

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S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
28	JANITORIAL CABINET			
	Provide and install Janitor Space consisting of 3/4" thick pre polished Marble shelves with bull-nose rounded edges lay on 1½ x 1½ M.S angle for support including 3/4" thick lamination board shutter fixed with spring hinges including 6" wide & 3/4" thick flamed marble over 4" thick block masonry ledge all hardware, anti rust paint and spray paint, wastage, etc. Complete in all respect as shown in drawing and as directed by the Architect.	36 Sft		
29	PANTRY BASE CABINET			
	Providing, making and install wooden base cabinet consisting of 3/4" thick pre-polished granite top having demi-bullnose edges, place with marble jelly over 2" thick precast RCC slab, including the cutting of bowl for under counter sink, along with 3/4" thick laminated board cabinet Shutter, shelf with matching PVC lipping, S.S handle, S.S hinges, locks key set, magnetic catchers including all necessary hardware and material, wastages etc. Complete in all respect as shown on drawing and as directed by the Architect. Use lamination by Al-Noor or Patex	51 Sft		
30	PANTRY HANGING CABINET			
	Providing and making Wooden cabinet consisting of 3/4" thick laminated board Shutters, shelves including matching PVC lipping, S.S handle, hinges, locks, catchers all necessary hardware and material, wastages etc. Complete in all respect	40 Sft		

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	as shown on drawing and as directed by the Architect. Use lamination by Al-Noor or Patex.			
31	FILLING CABINET			
	Providing and making base and hanging Wooden filling cabinet consisting of 3/4" thick laminated board Shutters, shelves and lamination top including matching PVC lipping, S.S handle, hinges, locks, catchers all necessary hardware and material, wastages etc. Complete in all respect as shown on drawing and as directed by the Architect. Use lamination by Al-Noor or Patex.	245 Sft		
32	FIXED AND SLIDING ALUMINUM WINDOWS			
	Provide, fabrication & installation in position Aluminum fixed and sliding window consisting of 6mm + 12mm air space + 6mm clear glass, with machine polish edge finish, fly mesh shutter, safety films with approved Aluminum section, natural anodized finish with all other hardware's, gasket, silicone sealant, wastage, schedule etc., complete in all respect as per drawing and related detail and as directed by the Architect. Use Aluminum section from Pak. cables, Chawla, Prime Aluminum or approved equivalent	1335 Sft		
33	BULLET-RESISTANT GLASS			
	Supply and installation of 32mm thick laminated bullet-resistant glass, certified to UL 752 Level 2 (stoppage of 357 Magnum), consisting of alternating layers of tempered glass and polycarbonate bonded with PVB interlayers.	20 Sft		

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	Includes polished edges, UV protection, and 85% light transmission, complete in all respect as per drawing and related detail and as directed by the Architect.			

S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
34	LOOKING MIRROR			
	Provide and install 6mm thick looking mirror (Imported) pasted with approved quality of double tape over 1/8" thick commercial ply including 1/8" thick stainless-steel U shape channel at the top and bottom of mirror which will be screw on plastered surface wall, cutting, lifting, shifting, wastages etc. Complete in all respect as shown in drawing and as directed by the Architect.	45 Sft		
35	FROSTED FILMS			
	Provide and apply self-adhesive Computerized Printed Frosted film 100 microns as per design from outside, with cutting, wastage, etc. complete in all respect as shown on drawing and as directed by the Architect.	1285 Sft		
36	SAFETY FILMS			
	Provide and apply self-adhesive safety film 100 microns as approved as per design from inside, with cutting, wastage, etc. complete in all respect as shown on drawing and as directed by the Architect.	1285 Sft		
37	WOODEN PELMET			

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	Provide, make and fix wooden pelmet consisting of 1/2" thick x 4" width MDF board including the cost of approved shade of paint work with all necessary hardware and material, cutting, lifting, glue, nails, scaffolding and wastages etc. Complete in all respect as shown in drawing and as directed by the Architect. Use MDF : ZRK / Malaysian or approved equivalent.	205 Rft		
38	ROLL-UP BLINDS			
	Provide and install window perforated / black out roll-up blinds of approved quality and make with wastage etc. complete in all respect as per manufacture specification and as directed by the Architect. SOURCE: The Protector or approved equivalent.	1365 Sft		
39	RECEPTION COUNTER			
	Provide, make and install in position 22'-0" X 3'-0" X 8'-6" high reception counter consisting of approved quality sample of block masonry for structure/supporting walls using 6" thick solid blocks, with a compressive strength, and also including the cost of pre-cast slab for top, Plaster finish, 3/4" thick pre-polished granite on top and facia, 12 mm thick clear tempered float glass with edge polishing and chamfering, 2- 1/2" dia S.S pipes supports brush finish, 2"x4"x18 swg and 4"x4" in size mdf board beam for display and teak ply polish finish light pelmet, teak wood polish finish strip ceiling, internal base cabinets, mobile unit, shelves cutting, lifting, wastages etc. Complete in all respects as shown in drawings and as directed by the Architect.	1 Job		

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S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
40	PAINT WORKS			
	Providing and applying approved shade of paint minimum three coats over concrete or plastered surfaces with all required filling, using sand paper for rubbing to make smooth finish at any level & height including minimum two coats of primer sealer from "JOTUN / KANSAI" to be applied as per Architects guidelines along with both the primer coats in thin layers just to fill the voids / pin holes and achieve smooth surfaces with first paint coat to be applied using white color and rest of the coats in approved shade of paint to concrete / wall surfaces, grooves, jambs, sills and all coved junctions having all equipment such as: roller brush, tray, polythene sheet or waste paper to cover floor and other space, masking tape, scaffolding and wastages etc. Complete in all respects as directed by the Architects.	29205 Sft		
41	CEMENT CONCRETE SCREED AT ROOF			
	Providing and installation of Cement Concrete 1:3:3 (1 cement, 3 screened sand, 3 crush) screed in required slope, minimum 2" thick to 3" thick including curing, making ridges, valleys, champhered edges, hacking of existing surface for bonding where necessary, etc. complete in all respect as directed by the Architect.	4600 Sft		
42	ROOF CORNER GOLA			

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	Providing and installation of Corner gola 1:3:3 (1 cement, 3 sand, 3 crush) Gola in required slope, minimum 4" thick to 5" thick including curing, making ridges, valleys, champhered edges, hacking of existing surface for bonding where necessary, etc. complete in all respects as shown on the drawing and directed by the Architect.	245 Sft		
43	M.S GRILLS			
	Providing and fixing M.S. Grill of approved design/pattern made with M.S flat 1"x1/8" & 3/8" M.S bars/rods placed at 100mm to 125mm center-to-center (C/C), securely welded to an outer frame of 3/4" x 3/4" M.S. Angle or Flat. The work includes painting with one coat of red oxide primer and two or more coats of enamel paint of approved shade/color, including fixing with holdfasts to masonry/concrete, at all heights/floors, and complete in all respects as shown on the drawing and directed by the Architect.	1385 Sft		
44	ROLLING SHUTTER			
	Providing and Fixing 1/2" dia bars grill rolling shutter, consisting of steel frame of M.S channel 2"x11/4"x1/8" (50x30x3mm) angle iron 11/2"x11/2"x1/8" (40x40x3mm) M.S plate 1'x1'x1/8" (300x300x3mm) GI pipe 11/2" (37mm) dia, spring 2' (600mm) center to center, rollers 24 SWG GI covering 1'x1' (300mm),	125 Sft		

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	handles, holdfast interlocked, with top cover, side guides, heavy-duty springs, and locking system, including, transportation, painting, and installation as per manufacturer specifications and complete in all respects as shown on the drawing and directed by the Architect.			
45	ROOF INSULATION			
	Providing and fixing 50 mm thick Jambool insulation with a density and thermal conductivity on roof. With all necessary hardware and material, cutting, lifting, and wastages etc Complete in all respects as shown on the drawing and directed by the Architect.	2445 Sft		

S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
46	M.S FENCING			
	Providing, Fixing and installation of fencing specification, description and detail same as existing fencing, transportation, painting, and installation as per manufacturer specifications and complete in all respects as shown on the drawing and directed by the Architect. contractor must visit and review detail of existing fence.	535 Rft		
47	OPERATION AND EXIT CABIN			
	Supply and installation of a pre-fabricated Portable Fiberglass Reinforced Plastic Cabin, manufactured with high-quality, weather-resistant materials, complete with structural,, cutting, lifting, all fixing arrangements, wastage,	2 Nos		

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	and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.			
48	M. CYCLE LANE CANOPY			
	Provide and fix in a position of canopy consisting of 3/4" thick cement board sheet screwed to 4"x2" metal framework, 4"x4" vertical posts between 10' center to center gaps, including cost of base plate, rawal bolts, rawal plugs with all requirements, including the cost of three coats of Matt Enamel paint finish, making grooves at sheet joints (where required), cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	175 Sft		
49	DRIVERS WAITING AREA CANOPY			
	Provide and fix in a position of canopy consisting of fiberglass sheet screwed to 4" x 2" metal framework, 4"x4" vertical posts between 10' center to center gaps, including cost of base plate, rawal bolts, rawal plugs with all requirements, including the cost of three coats of Matt Enamel paint finish, making grooves at sheet joints (where required), cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	125 Sft		
50	HEAD OFFICE MAIN GATE			
	Removing and refixing of MS gate with any damages part servicing, shifting, painting, and installation as per manufacturer specifications	1 Job		

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	and complete in all respects as shown on the drawing and directed by the Architect.			
51	RUGS FOR TANKS			
	Provide and fixing 1½" dia. 14 SWG stainless steel pipes rungs embedded into tank walls (where required), between 12" c/c gaps, cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect.	15 Nos		
52	THERMOPLASTIC PAINT			
	Providing and laying of hot applied thermoplastic paint of 2.5 mm thickness x 4-inch width (Road & Parking Lanes in yellow & white color) of uniform finish with thermoplastic paint with machine in white/yellow color and super imposed with reflect rising glass beads including cleaning the surface of all dirt, seals, oils, grease and foreign material and spraying of reflect rising glass beads @ 250 gm/sqm, guarding, barricading, etc. Complete in all respect specifications directed by the Architect.	2075 Rft		

S.N O	DESCRIPTION	QUANTI TY	RAT E	AMOUN T
53	STAINLESS STEEL RAIL			
	Providing, fabricating, and fixing Stainless Steel pipe fence/railing, 2-inch outer diameter pipe for top/bottom rails and posts, Grade 304 (as required). Including welding, grinding, polishing to a mirror/matt finish, fixing with concealed stainless-steel base plates and anchor bolts to			

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	concrete surface/core drilling, and cleaning upon completion. Height of fence 2-feet above ground level cutting, lifting, all fixing arrangements, wastage, and all necessary hardware and material, etc. Complete in all respects as shown in drawings and directed by the Architect. Size: approx. 3' - 6 " length each.	15 Nos		
54	MS MAIN GATES			
	Providing, fabricating and installation Gates consisting of 6"x4"x1/4" main MS tube frame that will be welded for the gate and MS sheet 14 swg, there will be vertical ribs metal hollow pipes of 1½" x 1½" thick 16swg welded to main frame over MS sheet 14 swg spray paint finish, latch inside box section, SS Studs, 2" dia MS pipe handle (approved), tower bolts & etc. and also including 2 nos vertical 6"x4" MS Shaf spray paint finish welded to main frame outer faces of gates. All the pipes are welded to each others inclusive of approved shade of spray paint work after applying anti rust paint, cutting, lifting, shifting, scaffolding, all hardware and material use for fabrication and wastages etc. Complete in all respect as shown in drawing and as directed by the Architect.			
54.1	Gate size: 20'-6" x 10'-0"	2 Nos		
54.2	Gate size: 9'-6" x 10'-0"	1 Nos		
54.3	Gate size: 4'-6" x 10'-0"	2 Nos		
54.4	Gate size: 3'-9" x 10'-0"	1 Nos		
55	PAVEMENT QUALITY CONCRETE			
	Providing and laying Pavement Quality Concrete (PQC) of specified grade (M40/M50), using slip-form or fixed-form pavers, including surface finishing, curing, making, champhered edges, hacking of existing surface for bonding where	975 Sft		

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	necessary, etc. complete in all respects as shown on the drawing and directed by the Architect.			
56	LANDSCAPE			
	TREES REMOVING AND RESHIFTING			
	Removing and resifting of trees, shifting and installation as per decided locations and complete in all respects as shown on the drawing and directed by the Architect.			
56.1	Trees 5'-15' (Shifting)	20 Nos		
56.2	Trees 16'-20' (Cutting)	20 Nos		
TOTAL AMOUNT OF CIVIL AND INTERIOR FINISHES WORK				

PSPCN-1 GATE
Allied Works at Malir, Karachi

HVAC

PSPC N-1 GATE

ALLIED WORKS AT MALIR, KARACHI
HVAC BOQ

March 27, 2026

S.No	Description	Qty.		UNIT RATE (RS)	TOTAL COST(RS)
1	2	3		4	5
Air-Conditioning Single Split System					
1	Supply, Installation,,Testing & Commissioning of Inverter base Cool & Heat type mini split type A/C units (T-3 Series) complete with ACRA-CLAD factory coated condenser fins, atmosphere friendly refrigerant etc. Complete with safety controls and accessories as per specification and drawings.				
i	Wall Mounted (Capacity 2.0 TR)	11	Nos.		
ii	Wall Mounted (Capacity 1 TR)	2	Nos.		
2	Supply, Installation, Testing & Commissioning of Copper Piping with Isolation valve & 3/4" thick foam insulation, cladding, pipe supports & pipe sleeves complete with all respects as per drawings & specification.				
ii	2.0 TR	650	Rft.		
iv	1.0 TR	100	Rft.		
3	Supply, installation, testing & commissioning of Ventilation & Exhaust fan with fitting, vibration isolator, Flexible connection & supports etc. as per specification and drawings.				
i	Exhaust Air Fan 180 cfm @ 0.5" ESP	1	No.		
ii	Decorative type Propeller Fan with automatic lower (100 cfm)	6	Nos.		
4	Supply & Installation of Air Devices with damper (Tuttle & Bailey standards) Complete with all respect as per specification and drawings.				
a.	Exhaust Air Grill				
i.	6" dia E.A.R	2	Nos.		
i.	9" dia E.A.R	3	Nos.		
b.	Exhaust Air Louvers				
i.	12" x 10" E.I.L	1	No.		
i.	12" x 8" E.I.L	1	No.		
i.	10" x 8" E.I.L	1	No.		
5	Supply, Installation, Testing & Commissioning of Low pressure G.I. Sheet Metal ducting (Machine Made) as per SMACNA & ASHRAE Standards for air ducting, plenums and other sheet fabrications including splitter dampers, take				



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	off, vanes elbows and other necessary fittings with galvanized hanger supports as per specification and drawings.				
i	24 Gauge	250	Sq.ft.		
6	Supply & Installation of UPVC Class-D Piping for equipment drain complete with Specialties, 0.5" thick closed cell foam insulation, wall, floor etc. core cutting, cladding complete with fitting & hanger supports etc. as per specification and drawings.				
i	1-1/2" dia (3/4" Insulation)	65	Rft.		
ii	1-1/4" dia (3/4" Insulation)	40	Rft.		
iii	1" dia (3/4" Insulation)	80	Rft.		
iv	3/4" dia (1/2" Insulation)	90	Rft.		



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HVAC BOQ

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S.No	Description	Qty.		UNIT RATE (RS)	TOTAL COST(RS)
1	2	3		4	5
7	Air Curtain (6'-0") Supply, installation, testing, and commissioning of a 6'-foot-long decorative air curtain with an air velocity of 2000 Feet Per Minute (FPM), complete with all necessary accessories including a disconnect switch, in accordance with the specifications and approved drawings.	2	Nos.		
8	Supply & Installation of Complete Electric power (from electric point to indoor as shown in drawing) & control wiring complete with PVC conduit & hanger supports etc. for Equipment as per Specification and drawings.	1	Lot		
9	Additional system atmosphere friendly refrigerant charge as per site requirement Complete with all respect as per specification and drawings.	1	Lot		
10	Equipment foundation and equipment shifting charges from Ground floor to foundation pads as per specification and drawings.	1	Job.		
11	Supply & Installation of 3" dia core cutting complete with all respect.	6	Nos		
12	Cost of testing, starting up, commissioning, balancing, adjusting and handling over of the complete Plant.	1	Job.		
GRAND TOTAL (RS)					

PSPCN-1 GATE
Allied Works at Malir, Karachi

Plumbing

PSPC N-1 GATE

ALLIED WORKS AT MALIR, KARACHI

Plumbing BOQ

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S.No	Description	Qty.		UNIT RATE (RS)	TOTAL COST(RS)
1	2	3		4	5
PART- A INTERNAL PLUMBING SYSTEM					
1	Supply, installing, testing and commissioning of electric operated hot water geyser (storage type) of approved make and capacity as specified, comprising corrosion-resistant inner tank, imported thermostat, heating element, safety valve, insulation, mounting accessories, and all necessary fittings, suitable for working pressure up to 60 PSI, complete in all respects, in accordance with drawings, specifications.				
i	15 Ltr	1	Nos.		
2	Supply & Installation of approved quality European type water closet (WC) with close coupled cistern, including all internal cistern fittings, flush mechanism, inlet/outlet connections, acrylic seat cover, fixing accessories, floor bolts, wax seal, and all necessary fittings, complete in all respects, in accordance with drawings, specifications. Approx. Size: Width: 14 - 16 inches x Depth: 28 - 30 inches x Seat Height: 15 - 17 inches	5	Nos.		
3	Supply & Installation of Eastern style water closet of approved make, complete with flushing cistern, internal cistern fittings, flush pipe, footrests, trap, necessary brackets, and all required accessories, including connection to soil pipe and water supply line, complete in all respects, in accordance with drawings. Approx. Size: L: 25 – 27 inches × W: 17 - 19 inches × H: 7 – 9 inches	6	Nos.		
4	Supply & Installation of Wash Basin Complete Set wash of approved make, size and color, complete with waste coupling, bottle trap, tee stop cocks (angle valves), necessary brackets, supports, CP connection pipes, and all required fittings and accessories, including connection to water supply and drainage system, complete in all respects,	7	Nos.		

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	in accordance with drawings, specifications, and instructions of the Engineer/Consultant				
5	Supply & Installation of single lever tap of approved make, chrome plated brass body, complete with cold water connections, flexible connection pipes, cartridges, necessary fittings, fixtures, and all required accessories, including testing and commissioning, complete in all respects, in accordance with drawings, specifications.	7	Nos.		
6	Supply & Installation of Towel Dispenser (SS body) complete with all respect.	7	Nos.		
7	Supply & Installation of WC Hand Operated Shower With double bib Valve complete with all respect.	7	Nos.		
8	Supply & Installation of Sanitizer -Automatic.	6	Nos.		
9	Supply & Installation of Toilet Roll Holder.	7	Nos.		
10	Supply & Installation of S.Steel Robe hooks.	6	Nos.		
11	Supply & Installation single compartment kitchen sink of approved make, stainless steel construction, complete with tap for the bowl, waste coupling with drain lever mechanism, tee stop cocks (angle valves), bottle trap/P-trap, CP connection pipes, necessary brackets, supports, and all required fittings and accessories, including connection to water supply and drainage system, testing and commissioning, complete in all respects, in accordance with drawings, specifications	1	No.		

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S.No	Description	Qty.		UNIT RATE (RS)	TOTAL COST(RS)
1	2	3		4	5
12	Supply and installation of C.P Tee valves, for cistern water inlet CP connectors with nuts and fittings.	22	Nos.		
13	WATER DISTRIBUTION SYSTEM				
a.	Supply and installation of PPR PN 20 piping for cold & Hot water system (hot water system only for pantry) , with fittings, specialties, including all cutting, fitting, fixing and cleaning, wall and slab sleeves/Core Cutting, CP clamps, hangers and supports, making connection with fixtures, valves and specialties, chiseling, making wall a floor openings and making good, pressure testing at a pressure of 250 psi, painting of exposed piping in occupied areas with primer and coats of approved paint in approved color complete in all respect.				
i.	2" diameter	90	Rft.		
ii.	1 1/2" diameter	50	Rft.		
iii.	1 1/4" diameter	150	Rft.		
iv.	1" diameter	90	Rft.		
v.	3/4" diameter	80	Rft.		
vi.	1/2" diameter	300	Rft.		
b.	Gate Valve				
i.	1 1/2" diameter	2	Nos.		
ii.	1 1/4" diameter	2	Nos.		
iii.	1" diameter	4	Nos.		
14	SOIL, WASTE AND VENT SYSTEM				
a.	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for soil, waste & vent stacks and horizontal runs buried in ground or above false ceiling, in shafts exposed or concealed in floors and walls and connecting to manholes, including cutting, fitting, chiseling, wall and slab sleeves/Core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				



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i.	4" diameter	480	Rft.		
ii.	3" diameter	200	Rft.		
iii.	2" diameter	300	Rft.		
15	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for RAIN WATER including cutting, fitting, chiseling, wall and slab sleeves/Core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				
i.	4" dia	80	Rft.		
16	Supply and installation of Floor Drain with Trap complete in all respect.				
i	3" dia	14	Nos.		
17	Supply, installation, testing, and commissioning of vent cowl for sewerage piping system, with approved drawings, project specifications. Approved				
i.	3" dia	2	Nos.		
ii	4" dia	1	No.		

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S.No	Description	Qty.		UNIT RATE (RS)	TOTAL COST(RS)
1	2	3		4	5
18	Supply and installation of Clean Out complete in all respect.				
ii.	4" dia	4	Nos.		
19	Stainless Steel Grease Trap for Kitchen Installed Below Sink on Floor (Size = 24" L x 18" W x 18" H)	1	No.		
TOTAL COST PART-A PLUMBING SYSTEM (Rs.)					
PART-B EXTERNAL PLUMBING SYSTEM					
1	Supply, Installation, testing & commissioning of centrifugal O.H. water Transfer pumps complete with Motor, Auto water filling control system and accessories as per drawings and specifications. (25gpm, 80ft. Head).	1	Nos.		
2	Supply & installation of R.C.C M.H with Heavy duty cover complete with all respect as per drawing & specification. (Local with Stanton cover)	5	Nos.		
3	Supply and installation of Rain water Chanel including heavy duty High-density polyethylene (HDPE) gratings as per specification & drawing.				
i.	18"X 18"	6	Nos.		
4	WATER DISTRIBUTION SYSTEM				
a.	Supply and installation of PPR PN 20 piping for Water, Irrigation system , with fittings, specialties, including all cutting, fitting, fixing and cleaning, wall and slab sleeves/Core Cutting, CP clamps, hangers and supports, making connection with fixtures, valves and specialties, chiseling, making wall an floor openings and making good, pressure testing at a pressure of 250 psi, painting of exposed piping in occupied areas with primer and coats of approved paint in approved color complete in all respect.				
i.	1 1/4" diameter	110	Rft.		
ii	1" diameter	320	Rft.		
a.	Gate Valve				
i	1 1/2" diameter	4	Nos.		
ii	1 1/4" diameter	2	Nos.		
iii.	1" diameter	2	Nos.		
b.	Float valve	1	Nos.		



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b.	Foot valve				
i	1 1/2" diameter	2	Nos.		
d	Strainer				
i	1 1/2" diameter	2	Nos.		
6	SOIL, STROM WATER SYSTEM				
a.	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for soil and Strom stacks and horizontal runs buried in ground or above false ceiling, in shafts exposed or concealed in floors and walls and connecting to manholes, including cutting, fitting, chiseling, wall and slab sleeves/Core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				
i.	6" diameter	580	Rft.		

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S.No	Description	Qty.		UNIT RATE (RS)	TOTAL COST(RS)
1	2	3		4	5
7	Supply & Installation of Weatherproof MCC for Plumbing System with circuit Breakers, Disconnect switches, fuses, starters etc. for all equipment as per specification & drawing. (Isolation breakers shall be finalized as per manufacturer specifications.)	1	Nos		
8	Supply & Installation of Complete Electric power & control wiring complete with PVC conduit and power wiring will be in G.I Cable tray & hanger supports etc. for Equipment as per Specification and drawings.	1	Job		
9	Excavation and back filling for the Strom,sewerage and plumbing pipes as per drawings and specifications.	1	Lot.		
TOTAL COST PART-B PLUMBING SYSTEM (Rs.)					
PART-C EXISTING WATER PUMP SHIFTING					
1	Supply, installation, testing, and commissioning of HDPE piping complete with all necessary fittings and specialties, including cutting, jointing, fixing, and cleaning. The scope shall include provision of wall and slab sleeves/core cutting, CP clamps, hangers, and supports; connections to fixtures, valves, and associated specialties; chiseling and formation of wall and floor openings; and making good to original finishes after installation. All piping shall be pressure tested at 250 psi to ensure system integrity. The work shall be completed in all respects in accordance with project specifications and approved drawings.				
a.	3" diameter	840	Rft		
b.	2" diameter	270	Rft		
2	Supply and installation of UPVC Class D piping including all fittings, sockets, hangers and specials for Tanker Water stacks and horizontal runs buried in ground, including cutting, fitting, wall core Cutting, making good, fixing and cleaning, wall and slab openings complete in all respect.				
a.	3" diameter	72	Rft		

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3	Dismantling and re installation of existing water supply pump with Equipment foundation and equipment shifting charges as per drawings and specifications.	1	Lot		
4	Excavation for water supply pipelines including road cutting, dressing of trench bottom, backfilling with approved material in layers with proper compaction, disposal of surplus material, and reinstatement of road and surrounding surfaces to original condition, complete as per drawings and specifications.	1	Job		
5	Supply & Installation of Weatherproof MCC for Plumbing System with circuit Breakers, Disconnect switches, fuses, starters etc. for all equipment as per specification & drawing. (Isolation breakers shall be finalized as per manufacturer specifications.)	1	Nos		
6	Supply & Installation of Complete Electric power & control wiring complete with PVC conduit and power wiring will be in G.I.Cable tray & hanger supports etc. for Equipment as per Specification and drawings.	1	Job		
7	Supply and Installation of valve chamber with 3" dia isolation valve for external water supply system for water supply complete in all respect.	2	Nos		



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S.No	Description	Qty.		UNIT RATE (RS)	TOTAL COST(RS)
1	2	3		4	5
TOTAL COST PART-C PLUMBING SYSTEM (Rs.)					
PART-D GENERAL WORKS					
1	Cost of testing, starting up, commissioning, balancing, adjusting and handling over of the complete system.	1	job.		
TOTAL COST-PART D GENERAL SYSTEM (Rs.)					
GRAND TOTAL COST (RS.)					

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Allied Works at Malir, Karachi

Electrical & Security Equipment's

PSPC N-1 GATE

ALLIED WORKS AT MALIR, KARACHI
Reception Building Electrical Works

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
	GENERAL NOTES:				
1	Quantities shown in BOQ are tentative, contractor should verify all quantities as per drawings and deliver at site as per actual quantity.				
2	All material should be procure from authorized vendor /supplier.				
3	Rate should be quoted based on the specified material/supplier as mentioned in approved material list.				
4	Any material which is procured without consultant approval is not acceptable and should be removed at their own cost by the contractor.				
5	This is the responsibility of electrical contractor to prepare coordinated shop drawings submitted to consultant for review and approval before execution of works at site.				
6	This is the responsibility of contractor to coordinate with other services at site.				
1.0	LV POWER CABLES Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required, clipped to surface with cleats or on previously installed cable tray/ trunking or raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect.				
1.1	4C-50 Sqmm Cu/PVC/PVC Cable +1C-25 Sq.mm Cu/ PVC Cable as a ECC. (Main Incoming Cable to MDB)	150	R.ft		
1.2	4C-35 Sqmm Cu/PVC/PVC Cable +1C-16 Sq.mm Cu/ PVC Cable as a ECC.	50	R.ft		
1.3	4C-16 Sqmm Cu/PVC/PVC Cable+1C-10 Sq.mm Cu/ PVC Cable as a ECC. (Main Incoming Cable to DB-G)	50	R.ft		
1.4	4C-16 Sqmm Cu/PVC/PVC Cable+1C-10 Sq.mm Cu/ PVC Cable as a ECC.(Main Incoming Cable to DB-F)	50	R.ft		
			SUB TOTAL-01		
2.0	LV MAIN /SUB MAIN DISTRIBUTION BOARD				
	Supply & Installation, connection, testing & commissioning of following mixed capacity MCCB / MCB / Magnetic Contractor / Relay etc. LV MDB /SMDB/DB's Surface / Flush Type, Floor / Wall with 16 SWG Sheet steel housing with approved color				

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	code, complete with all mounting accessories as per Single Line drawings and specifications, complete in all respect.				
2.1	MDB-1	1	No.		
2.2	DB-GF	1	No.		
2.3	DB-FF	1	No.		
			SUB TOTAL-02		
3.0	INTERNAL WIRING				
3.1	POINT WIRING				
	Supply, installation, Testing, commissioning and connection of Point Wiring for light Fixture and Fan with 3 x 1c x1.5 Sq.mm PVC insulated copper wire in 25mm dia. PVC conduit surface/ concealed mounted including all required mounting and installation accessories, etc., complete in all respects.				
a)	From Light controlled switch to 1st Light fixture.	50	No.		
b)	Point wiring b/w light fixture to light fixture	50	No.		
c)	Exhaust Fan Point.	8	No.		
d)	Ceiling Fan point	16	No.		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
3.2	CIRCUIT WIRING				
a)	Supply, installation, testing, commissioning, and connection of circuit wiring from the Distribution Board (DB) to the lighting control first switchboard and from first to other switchboards, using 3 × 1C × 2.5 sq.mm single-core PVC insulated copper conductors drawn in 25 mm diameter PVC conduit, including all necessary installation and mounting accessories, complete in all respects as per approved drawings and specifications.	15	No.		
b)	Supply installation and connection of Wiring for 13A, Multi Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	25	No.		
c)	Same as item no b) but point to point wiring.	10	No.		
d)	Supply installation and connection of Wiring for 13A, Flat Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (UPS circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
e)	Same as item no d) but point to point wiring.	5	No.		
f)	Supply installation and connection of Wiring for 15A, Multi Pin/Flat pin switch socket outlets from DB to first outlet point with 3x1C-4mm ² PVC insulated copper wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW/UPS circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
g)	Supply, Installation & Wiring of 1.0/1.5 TR split AC from DB to respective indoor isolator/socket and from indoor to outdoor isolator with 3x1C-4mm ² PVC cable in 25mm dia PVC conduit complete with all required installation and mounting accessories complete in all	10	No.		

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	respects per drawing and specification.				
g)	Supply, Installation & Wiring of 2.0/2.5 TR split AC from DB to respective indoor isolator/socket and from indoor to outdoor isolator with 3x1C-6mm ² PVC cable in 25mm dia PVC conduit complete with all required installation and mounting accessories complete in all respects per drawing and specification.	10	No.		
				SUB TOTAL-03	
4.0	RACEWAY & BOXES for ELECTRICAL SYSTEMS				
	Supply and installation of following sizes PVC conduit with all required installation accessories like tee, bend, etc., for sub-main cables on concealed / surface, complete in all respect as per drawing & specification. Complete in all respect.				
4.1	25 mm dia. PVC conduit	1000	R.ft		
4.2	50 mm dia. uPVC Class 'D' conduit	150	R.ft		
4.3	100 mm dia. uPVC Class 'D' conduit	150	R.ft		
4.4	Supply & installation of 16 SWG sheet steel with powder coated Floor Type technologic boxes to accommodate following devices: 1 No. 13A, Multi-Pin(Simplex) switch socket outlet. 1 No. 13A, Flat-Pin(Duplex) switch socket outlet. 1 No. 2 x RJ 45 device plate outlet for data and voice outlet complete in all respect.	5	No.		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
4.5	Supply & installation of 16 SWG sheet steel with powder coated type-A technologic box to accommodate following devices: 1No. 13A, Multi Pin switch socket outlet.(Simplex) 1No. 13A, Flat Pin switch socket outlet.(Duplex) 1 No. 1x RJ45 device plate outlet for data. 1 No.1x RJ11 device plate outlet for data. complete in all respect.	10	No.		
4.6	Supply & installation of 16 SWG galvanized sheet steel powder coated type-B technologic box to accommodate following devices: 1No. 13A, Multi Pin switch socket outlet.(Simplex) 1No. 13A, Flat Pin switch socket outlet.(Duplex) 1 No. 2x RJ45 device plate outlet for data. 1 No. 2x RJ11 device plate outlet for data. complete in all respect..	10	No.		
4.7	Back Box: Supply and installation of 16 SWG sheet steel powder coated back box with brass earth terminal, complete in all respect.	150	No.		
			SUB TOTAL-04		
5.0	SWITCHES & SOCKET OUTLET				
	Supply & Installation of following type switches / sockets as per design drawings & specification, complete in all respect.				
5.1	10A,One gang switch unit.	1	No.		
5.2	10A,Two gang switch unit.	6	No.		
5.3	10A,Three gang switch unit.	7	No.		
5.4	10A,Four gang switch unit.	10	No.		
5.5	13A, Multi Pin switch socket unit.(Simplex).	50	No.		
5.6	15A, Multi Pin switch socket unit.(Simplex).	3	No.		
5.7	13A flat pin switch socket unit.(duplex)	10	No.		
			SUB TOTAL-05		
6.0	INTERIOR LIGHTING				
	Supply Installation, Termination and Commission of following lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, electronic ballast, connector (Porcelain), supports, hanging & fixing				

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	materials(Such as Steel Rod/Chain), etc. including all mounting and installation accessories. Complete in all respects.				
6.1	Linear LED Light Fixture, (Hanging Type), 40watt (4000K)	15	No.		
6.2	LED Downlight, light fixture (Recessed Type), 16 watt (4000K)	65	No.		
6.3	LED Downlight, light fixture (Recessed Type), 7 watt (4000K)	5	No.		
6.4	LED Downlight, light fixture (Surface Type), 16 watt (4000K)	25	No.		
6.5	LED Downlight light fixture (Recessed Type), 7 watt (4000K)	15	No.		
6.6	LED Downlight fixture (Recessed Type), 1x18W (4000K)	10	No.		
6.7	Mirror light fixture, Wall mounted type, 7watt, (4000K)	5	No.		
			SUB TOTAL-06		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
7.0	ESCAPE ROUTE LIGHTING				
	Supply Installation, Testing and Commission of the following Emergency lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, 3 Hour Back up battery, connector (Porcelain), supports, hanging & fixing materials(Such as Steel Rod/Chain), etc. including all required mounting and installation accessories. Complete in all respects.				
7.1	LED Emergency light fixture, Wall Mounted, 8 watt lamp self maintained type.	8	Nos.		
7.2	LED Emergency light 3 watt lamp non maintained type.	20	Nos.		
7.3	LED Emergency light Fixture, 8 watt lamp with Directional Pictogram	8	Nos.		
			SUB TOTAL-07		
8.0	FAN, EXHAUST FAN & HAND DRYER				
	Supply, installation and connection of following size of Ceiling fan, with all fixing accessories.				
a)	Ceiling Fan 56"	12	No.		
b)	Ceiling Fan 48"	6	No.		
c)	12 inch dia. sizes of wall / glass mounted exhaust fan, with louvers	8	No.		
8.1	HAND DRYER				
	Supply Installation, Testing and Commission of Hand dryer of approved brand. including all required mounting and installation accessories. Complete in all respects.	3	No.		
			SUB TOTAL-08		
9.0	STRUCTURED CABLING				
	Supply, installation, testing & commissioning of following items for data/voice communication system including all material, labor, tools, installation accessories. Complete in all respects. Quantities for cables shown in BOQ are estimated and taken from drawings. Contractor is advised to take measurement at site before commencement of works.				
9.1	Simplex Face plate with RJ-45 UTP CAT-6 I/O for Data including shutter, complete in all respect	10	Nos.		
9.2	Duplex Face plate with 2 Nos I/Os RJ-45 UTP CAT-6 for Data/Voice, including shutters, complete in all respect	20	Nos.		

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9.3	Supply, installation of 4 pair CAT-6 UTP cables for data system from rack to each workstation in already laid 25mm dia PVC conduit. Complete in all respects.	4000	R.ft		
9.4	Supply and installation of 25mm dia PVC conduit with all accessories like lindapters etc., for above cables on concealed / surface, complete in all respect as per drawing & specification.	1000	Mtrs.		
9.5	Supply and Installation of Following CAT-6 Patch Panels for data Communication system including all mounting accessories. Complete in all respects.				
9.6	24-port UTP CAT-6 patch panel with I/O for data	3	Nos.		
9.7	Front / Rear Cable Organizer.	3	Job		
9.8	3 feet long CAT-6 patch cord with RJ-45 connectors at both ends for voice.	25	Nos.		
9.9	9 feet long CAT-6 drop cord with RJ-45 connectors at both ends for voice.	25	Nos.		
9.10	Supply and Installation of 4 core multi mode 9/125um fiber cable connected as back bone between MDF and BAT	500	R.ft		
9.11	Supply, installation and connection of HDMI cables (15 Meter)including all accessories as per specifications and drawings.	2	No.		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
9.12	Supply, installation and connection of VGA cables (15Meter) including all accessories as per specifications and drawings.	2	No.		
9.13	Supply and Installation of 19U, 33" wall mounted rack, 600mm(W) x 600mm(D), with 4 imported power socket panel and 1 No. exhaust fan	1	No.		
9.14	Testing, Commissioning, proper tagging, Fluke Testing & Submission of Fluke Report along with 20 year warranty certificate from principal of brand for complete DATA Communication System by authorized local representative of the manufacturer.	1	Job.		
9.15	Supply, installing, Testing & Commissioning of following multi pair telephone cable in already laid appropriate size of PVC conduit complete in all respects.				
a)	25 pair Cable	400	R.ft		
SUB TOTAL-09					
10.0	VIDEO SURVEILLANCE SYSTEM				
	Supply, Installation of 5 MP 1/3" color low light TM enhanced sensitivity PAL digital color view HD CMOS camera (IP base) Onvif support, H.265, MPEG-4 & MJPEG compression, Day/Night Performance, operating on PoE / 24VAC power input including 3 -9mm varifocal Auto Iris lens, with password protection and required metal mounting bracket with all required installation accessories, as per specifications. complete in all respect.				
10.1	Fixed Type Camera	10	Nos		
10.2	Dome Type Camera	5	Nos		
10.3	Supply, installation, testing, and commissioning of 4 MP indoor Facial Recognition Camera dome type with varifocal lens (6-22 mm), AI analytics, True WDR, IR range 30 m, H.265 video compression, PoE, IK10 & IP67 protection, including power adapter, junction box, and mounting bracket. Complete with all power/control cabling, installation, and commissioning as per approved drawings, specifications or as directed by the Engineer/Consultant.	4	Nos		
10.4	Supply, installation and connection of 4 pair CAT-VI cable for CCTV camera. In already laid 25mm dia. PVC conduit or via cable tray including all required installation and mounting	3000	R.ft		

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	accessories as per specifications and drawings. Complete in all respect.				
10.5	Supply and installation of 25mm dia PVC conduit with all required installation and mounting accessories for above cables on concealed / surface, complete in all respect as per drawing & specification.	1000	R.ft		
10.6	Supply and installation of Junction Box 12" x 8" x 4" with cover plate, concealed / surface mounted, fabricated from 16 SWG sheet steel, powder coated complete with all fixing arrangements and accessories, complete in all respect.	1	No		
10.7	Testing, Commissioning and proper tagging of CCTV System by authorized local representative of the manufacturer with Licensing the Client Based Software for playback and video retrieval, including individual cameras licensing complete in all respect as per Vendor's Recommendation/ System requirement.	1	Job		
		SUB TOTAL-10			

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
11.0	FIRE DETECTION AND ALARM SYSTEM				
11.1	Supply ,Installation Testing & commissioning of Addressable type fire alarm Control Panel (FACP). shall have alarm facilities, hooter, fire / fault indicators, audio video signals, battery, battery charger, central processing unit, network integrator module, power supply, and also for detector actuated alarms, etc., Panel Should have SMS Module to generate alert message to at least 5 Persons, complete in all respects as per drawing & specifications.	1	No.		
11.2	Supply & Installation of Addressable optical smoke detector with base as per drawing & specifications.	11	No.		
11.3	Supply & installation of Addressable Heat detector with base as per drawing & specifications.	1	No.		
11.4	Supply and Installation of Electronic Sounder with flasher as per drawing & specifications.	3	No.		
11.5	Supply and Installation of Electronic Sounder as per drawing & specifications.	5	No.		
11.6	Supply and Installation of Manual Call Point as per drawing & specifications.	5	No.		
11.7	Supply and installation of wiring of Fire Alarm System devices with 1.5 Sq.mm two core shielded Fire resistant/retardant PVC/PVC cable(min 60 minutes) in 1" dia. M.S conduit in loops (ring circuits) from FACP surface run conduits to be M.S. 16 SWG anticorrosive red painted conduits with required installation and mounting accessories, complete in all respects as per drawings and specifications.	1000	R.ft		
11.8	Supply and installation of Fire alarm Junction box 12" x 8" x 4" with cover plate, concealed / surface mounted fabricated from 16 SWG sheet steel, powder coated, complete with all fixing arrangements and accessories, complete in all respect.	1	No.		
11.9	Testing, Commissioning and proper tagging of FA System by authorized local representative of the manufacturer.	1	Job.		
		SUB TOTAL-11			



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12.0	WALK THROUGH GATE(WTG) : Supply, Installation, testing and commissioning of Dual Sensor Walk Through Gate (Metal & Cell Phone Detector) For Metals Detection of all metal weapons, including light alloys threats, High Throughput, Multi zone red signaling For Cell Phone: Detection of standard and miniaturized cell phones and smartphones, Detection of magnetized items, Multi zone yellow signaling with all required installation and mounting accessories, Control Cables, power Cables, Conduit etc. etc. complete in all respect.	2	Nos.		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
13.0	GLASS FLAPPED SPEED GATE (GFSG) Supply, Installation, testing and commissioning of GFSG, complete with Cabinet AISI 304-Grade stainless steel main body and lateral lids, Top Cover & Flaps: Tempered Glass, Control: Motor start and stop control is maintained by control card, lower power consumption and silent running senses forbidden and reverse direction passing, all the obstacles in the passage are sensed with photoelectric sensor, Operational temp range - 15 C and +65 C 95% non-condensing humidity with all required installation and mounting accessories like control cables, power cables, conduits etc. etc. complete in all respect, Cabinet: Main body and lateral lids are AISI 304-grade stainless steel, Turnstile is equipped with an alarm system which senses forbidden and reverse direction passing, should have built in Control Card, Turnstiles closes flaps by itself after adjusted time if a valid card is presented but person not passed, compatible with all Access Control Systems, 200W of Power Consumption with 1 Amper Fuse, in case of Power Failure it must open in 2 directions, Between -15 °C and +65 °C, 95% non-condensing humidity; 220 V +/- 10%, mono phase, 50-60 Hz should work in Environmental and Power conditions, UPS (optional), logo can be printed on the flaps, sound signaling device. Must be Certified with following;- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1 Should have EU, EC and EN Certification with all required installation and mounting accessories like control cables, power cables, conduits etc. etc. complete in all respect.	2	Nos.		
14.0	Supply, Installation, testing and commissioning of Access Control Card Reader Device compatible with Door Controller, can be used for Outdoor Installation, Rated with IP65, 3-color High illuminated LED, can support DESFire, MiFare, EV1, EV2 and EM Cards, can communicate with Wiegand and RS-485 enabled. should have GDPR compliance, and compliance with	4	Nos		

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	ISO 9001/14001				
15.0	Door Controller:				
	Supply, installation, testing and commissioning of Door Access Controller, capable of controlling the opening and closing of four doors simultaneously, complete with 4 Wiegand reader inputs, 4 lock interfaces, and 8 zone monitoring inputs. The controller shall include built-in LED status indicators for door status, buzzer alarm for entry/exit notification, detachable terminal blocks, and built-in battery backup. The system shall support OSDP (Open Supervised Device Protocol) for secure communication with peripheral devices and integration with the Security Management System, with schedule capacity of minimum 1024, event log storage up to 50,000 records, and user capacity up to 50,000 users. The controller shall include zone alarm monitoring, at least one monitored bell/siren output port, and operate on a 32-bit RISC processor (ARM Cortex-M3 core) with 10/100 Mbps Ethernet interface with auto-detection and minimum 8 MB serial flash memory. The controller shall be suitable for operation in environmental conditions of -20°C to +60°C and up to 90% non-condensing humidity. The device shall comply with GDPR requirements and certified with KC, CE, FCC, RoHS, and manufactured under ISO 9001 / ISO 14001 standards. Complete with all accessories, mounting, configuration, testing and commissioning as per approved drawings, specifications, and as directed by the Engineer/Consultant.	2	Nos		
		SUB TOTAL-12 to 14			

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
16.0	EARTHING SYSTEM				
	Supply, installation and connecting Chemically Enhanced Earth using copper bonded rod filled with soil conditioning material with 10'ft deep boring and back fill, chemical to enhance conductivity. Complete with termination clamps, cable from earth rod/pipe to inspection pit etc. as shown in drawings and details complete in all respects as per specification.				
16.1	Supply, installation of 20 mm dia, 3000mm long threaded copper bonded earth rod including Cable Clamp (type G), Complete in all respects.	2	Nos.		
16.2	Supply & installation of inspection pit with grey polymer lid as per drawing & specification.	2	Nos.		
16.3	Supply, installation and connection of the following PVC insulated/Bare Cu earthing conductors in conduit/directly buried as per drawings and specifications.				
16.4	From Equipment Body to ECP 1C-35 mm ² PVC cables (Green)	200	R.ft		
16.5	From Earth Pit to ECP 1C-35mm ² PVC cables	100	R.ft		
16.6	Conduit for Earth Cable 38 mm dia. uPVC pipe class 'D'	100	R.ft		
16.7	Supply, installation of Bentonite Moisture Retaining Clay, Powder. Weight: 25kg/Bag	5	Nos.		
16.8	Supply, installation of Earth Connecting Point (ECP) or Equipotential bar made with 50mm wide and 5mm thick Copper. Bar shall be provided with holes suitable for installation ECP shall be enclosed in appropriate size of powder coated metal enclosure with front accessible cover. The cover shall be made with 16 SWG sheet.				
16.9	Supply, installation of Copper Earth Bar (4-Way) Single Disconnecting Link, Length: 475mm	1	Nos.		
	Note: Contractor is advised to confirm the cable running lengths and termination as per site conditions before commencement of work, any missing item which is not specified but essential to complete the system should be incorporated by contractor system should be complete in all respect, any item which is not covered will be paid by his own cost no variation will be entertained.				



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		SUB TOTAL-15			
17.0	ELECTRICAL HANDHOLE				
17.1	Excavation, Concreting & making RCC Handhole 3'-0" x 3'-0" x 3'-0" with heavy duty cover. Complete in all respect as per drawing or as directed by the Engineer.	4	Nos.		
		SUBTOTAL-16			
		GRAND TOTAL (1 to 16)			

PSPC N-1 GATE

ALLIED WORKS AT MALIR, KARACHI

Control Room Watch Tower Electrical Works

Bill of Quantities

March 27, 2026

Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
	GENERAL NOTES:				
1	Quantities shown in BOQ are tentative, contractor should verify all quantities as per drawings and deliver at site as per actual quantity.				
2	All material should be procure from authorized vendor /supplier.				
3	Rate should be quoted based on the specified material/supplier as mentioned in approved material list.				
4	Any material which is procured without consultant approval is not acceptable and should be removed at their own cost by the contractor.				
5	This is the responsibility of electrical contractor to prepare coordinated shop drawings submitted to consultant for review and approval before execution of works at site.				
6	This is the responsibility of contractor to coordinate with other services at site.				
1.0	LV POWER CABLES Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required, clipped to surface with cleats or on previously installed cable tray/ trenching or raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect.				
1.1	4C-16 Sqmm Cu/PVC/PVC Cable+1C-10 Sq.mm Cu/ PVC Cable as a ECC.	200	R.ft		
				SUB TOTAL-01	
2.0	LV DISTRIBUTION BOARD Supply & Installation, connection, testing & commissioning of following mixed capacity MCCB / MCB / Magnetic Contractor / Relay etc. LV MDB /SMDB/DB's Surface / Flush Type, Floor / Wall with 16 SWG Sheet steel housing with approved color code, complete with all mounting accessories as per Single Line drawings and specifications, complete in all respect.				
2.2	DB-Control Room	1	No.		
				SUB TOTAL-02	
3.0	INTERNAL WIRING				
3.1	POINT WIRING				

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	Supply, installation, Testing, commissioning and connection of Point Wiring for light Fixture and Fan with 3 x 1c x1.5 Sq.mm PVC insulated copper wire in 25mm dia. PVC conduit surface/concealed mounted including all required mounting and installation accessories, etc., complete in all respects.				
a)	From Light controlled switch to 1st Light fixture.	5	No.		
b)	Point wiring b/w light fixture to fixture	10	No.		
c)	Exhaust Fan Point.	1	No.		
d)	Ceiling Fan Point	2	No.		
3.2	CIRCUIT WIRING				
a)	Supply, installation, testing, commissioning, and connection of circuit wiring from the Distribution Board (DB) to the lighting control First switchboard and from first to other switchboards, using 3 × 1C × 2.5 sq.mm single-core PVC insulated copper conductors drawn in 25 mm diameter PVC conduit, including all necessary installation and mounting accessories, complete in all respects as per approved drawings and specifications.	5	No.		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
b)	Supply installation and connection of Wiring for 13A, Multi Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	3	No.		
c)	Same as item b but point to point wiring	3	No.		
d)	Supply installation and connection of Wiring for 15A, Multi Pin/Flat pin switch socket outlets from DB to first outlet point with 3x1C-4mm ² PVC insulated copper wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW/UPS circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
e)	Same as item 3.2 (d) but point to point wiring	3	No.		
f)	Supply, Installation & Wiring of 1.0/2.0 TR split AC from DB to respective indoor isolator/socket and from indoor to outdoor isolator with 3x1C-6mm ² PVC cable in 25mm dia PVC conduit complete with all required installation and mounting accessories complete in all respects per drawing and specification.	1	No.		
			SUB TOTAL-03		
4.0	RACEWAY & BOXES for ELECTRICAL SYSTEMS				
	Supply and installation of following sizes PVC conduit with all required installation accessories like tee, bend, etc., for sub-main cables on concealed / surface, complete in all respect as per drawing & specification. Complete in all respect.				
4.1	25 mm dia. PVC conduit	1000	R.ft		
4.2	50 mm dia. uPVC Class 'D' conduit	200	R.ft		
4.3	75 mm dia. uPVC Class 'D' conduit	250	R.ft		
4.4	Supply & installation of 16 SWG sheet steel with powder coated Floor Type technologic boxes to accommodate following devices: 1No. 13A, Multi-Pin(Simplex) switch socket outlet. 1No. 13A, Flat-Pin(Duplex) switch socket	2	No.		

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	outlet. 1 No. 2x RJ45 device plate outlet for data and voice outlet complete in all respect.				
4.5	Back Box: Supply and installation of 16 SWG sheet steel powder coated back box with brass earth terminal, complete in all respect.	25	No.		
			SUB TOTAL-04		
5.0	SWITCHES & SOCKET OUTLET				
	Supply & Installation of following type switches / sockets as per design drawings & specification, complete in all respect. (Schneider Pino Series or Equivalent)				
5.1	10A, One gang switch unit.	1	No.		
5.2	10A, Two gang switch unit.	6	No.		
5.3	13A, Multi Pin switch socket unit.(Simplex).	7	No.		
5.4	15A, Multi Pin switch socket unit.(Simplex).	5	No.		
5.5	13A flat pin switch socket unit.(duplex)	2	No.		
			SUB TOTAL-05		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
6.0	INTERIOR LIGHTING				
	Supply Installation, Termination and Commission of following lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, electronic ballast, connector (Porcelain), supports, hanging & fixing materials(Such as Steel Rod/Chain), etc. including all mounting and installation accessories. Complete in all respects.				
6.1	LED Downlight, light fixture (Recessed Type), 16 watt (4000K)	10	No.		
6.2	LED Downlight, light fixture (Surface Type), 16 watt (4000K)	5	No.		
				SUB TOTAL-06	
7.0	ESCAPE ROUTE LIGHTING				
	Supply Installation, Testing and Commission of the following Emergency lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, 3 Hour Back up battery, connector (Porcelain), supports, hanging & fixing materials(Such as Steel Rod/Chain), etc. including all required mounting and installation accessories. Complete in all respects.				
7.1	LED Emergency light fixture, Wall Mounted, 8 watt lamp self maintained type.	2	Nos.		
7.2	LED Emergency light 3 watt lamp non maintained type.	2	Nos.		
7.2	LED Emergency Exit light 8 watt lamp with directional pictogram.	1	Nos.		
				SUB TOTAL-07	
8.0	FAN & EXHAUST FAN				
	Supply, installation and connection of following size of Ceiling fan, with all fixing accessories.				
a)	Ceiling Fan 56"	2	No.		
b)	12 inch dia. wall / glass mounted exhaust fan, with louvers.	1	No.		
				SUB TOTAL-08	
9.0	STRUCTURED CABLING				
	Supply, installation, testing & commissioning of following items for data/voice communication system including all material, labor, tools, installation and mounting accessories. Complete in all respects. Quantities for cables shown in BOQ are estimated and taken from drawings. Contractor is advised to take measurement at site before commencement of works.				
9.1	Duplex Face plate with 2 Nos I/Os RJ-45 UTP CAT-6 for Data/Voice, including shutters, complete in all respect	15	Nos.		



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9.2	Supply, installation of 4 pair CAT-6 UTP cables for data system from rack to each workstation in already laid 25mm dia PVC conduit. Complete in all respects.	2500	R.ft		
9.3	Supply and installation of 25mm dia PVC conduit with all installation and mounting accessories like tee, bends etc., for above cables on concealed / surface, complete in all respect as per drawing & specification.	500	Mtrs.		
9.4	Testing, Commissioning, proper tagging, Fluke Testing & Submission of Fluke Report along with 20 year warranty certificate from principal of brand for complete DATA Communication System by authorized local representative of the manufacturer.	1	Job.		
9.5	Supply, installing, Testing & Commisioning of following multi pair telephone cable in already laid appropriate size of PVC conduit complete in all respects.				
	10 pair Cable	300	R.ft		
			SUB TOTAL-09		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
10.0	EARTHING SYSTEM				
	Supply, installation and connecting Chemically Enhanced Earth using copper bonded rod filled with soil conditioning material with 10'ft deep boring and back fill, chemical to enhance conductivity. Complete with termination clamps, cable from earth rod/pipe to inspection pit etc. as shown in drawings and details complete in all respects as per specification.				
10.1	Supply, installation of 20 mm dia, 3000mm long threaded copper bonded earth rod including Cable Clamp (type G), Complete in all respects.	2	Nos.		
10.2	Supply & installation of inspection pit with grey polymer lid as per drawing & specification.	2	Nos.		
10.3	Supply, installation and connection of the following PVC insulated/Bare Cu earthing conductors in conduit/directly buried as per drawings and specifications.				
10.4	From Equipment Body to ECP 1C-35 mm ² PVC cables (Green)	100	R.ft		
10.5	From Earth Pit to ECP 1C-35mm ² PVC cables	100	R.ft		
10.6	Conduit for Earth Cable 38 mm dia. uPVC pipe class 'D'	100	R.ft		
10.7	Supply, installation of Bentonite Moisture Retaining Clay, Powder. Weight: 25kg/Bag	5	Nos.		
10.8	Supply, installation of Earth Connecting Point (ECP) or Equipotential bar made with 50mm wide and 5mm thick Copper. Bar shall be provided with holes suitable for installation ECP shall be enclosed in appropriate size of powder coated metal enclosure with front accessible cover. The cover shall be made with 16 SWG sheet.				
a)	Supply, installation of Copper Earth Bar (4-Way) Single Disconnecting Link, Length: 475mm	1	Nos.		
	Note: Contractor is advised to confirm the cable running lengths and termination as per site conditions before commencement of work, any missing item which is not specified but essential to complete the system should be incorporated by contractor system should be complete in all respect, any item which is not covered will be paid by his own cost no variation will be entertained.				
			SUB TOTAL-10		
11.0	ELECTRICAL HANDHOLE				



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	Excavation, Concreting & making RCC Handhole 3'-0" x 3'-0" x 3'-0" with heavy duty cover. Complete in all respect as per drawing or as directed by the Engineer.	2	Nos.		
				SUBTOTAL-11	
			GRAND TOTAL (1 to 11)		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
	GENERAL NOTES:				
1	Quantities shown in BOQ are tentative, contractor should verify all quantities as per drawings and deliver at site as per actual quantity.				
2	All material should be procure from authorized vendor /supplier.				
3	Rate should be quoted based on the specified material/supplier as mentioned in approved material list.				
4	Any material which is procured without consultant approval is not acceptable and should be removed at their own cost by the contractor.				
5	This is the responsibility of electrical contractor to prepare coordinated shop drawings submitted to consultant for review and approval before execution of works at site.				
6	This is the responsibility of contractor to coordinate with other services at site.				
1.0	LV POWER CABLES Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required, clipped to surface with cleats or laid underground in PVC conduit as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect.				
1.2	1x3c- 6 Sq mm Cu/PVC/PVC Cable from Reception Building MDB	500	R.ft		
			SUB TOTAL-01		
2.0	LV DISTRIBUTION BOARD				
	Supply & Installation, connection, testing & commissioning of Wall mounted 6 way 16 SWG Powder Quoted distribution box, high Quality consist of Incoming & outgoing MCB, and Indication lamp complete with all required installation and mounting accessories as per Single Line drawings and specifications, complete in all respect.				
2.1	DB-Watchtower	1	No.		
	Incoming 01 No 20 Amp DP MCB Outgoing 01 No 10 Amp SP MCB 01 No 16 Amp SP MCB 01 No 16 Amp SP MCB (Spare)				
			SUB TOTAL-		-

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			02		
3.0	INTERNAL WIRING				
3.1	POINT WIRING				
	Supply, installation, Testing, commissioning and connection of Point Wiring for light Fixture and Fan with 3 x 1c x1.5 Sq.mm PVC insulated copper wire in 25mm dia. PVC conduit surface/ concealed mounted including all required mounting and installation accessories, etc., complete in all respects.				
a)	From Light controlled switch to 1st Light fixture.	2	No.		
b)	Point wiring b/w light fixture to light fixture	5	No.		
d)	Ceiling Fan point wiring	1	No.		
3.2	CIRCUIT WIRING				
a)	Supply, installation, testing, commissioning, and connection of circuit wiring from the Distribution Board (DB) to the lighting control switchboard, or between switchboards to switchboard, using 3×1c -2.5 sq.mm single-core PVC insulated copper conductors drawn in 25 mm diameter PVC conduit, including all necessary installation and mounting accessories, complete in all respects as per approved drawings and specifications.	2	No.		

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
b)	Supply installation and connection of Wiring for 13A, Multi Pin switch socket outlets from DB to first outlet point with 3x1C-2.5 mm ² PVC insulated Cu. wires in 25mm dia PVC conduit / trucking surface / concealed mounted and connections (RAW circuit) with all required installation and mounting accessories complete in all respect as per drawing and specification.	2	No.		
c)	Same as item no 3.2 (b) but point to point wiring	3	Nos		
			SUB TOTAL-03		
4.0	RACEWAY & BOXES for ELECTRICAL SYSTEMS				
	Supply and installation of PVC conduits of the following sizes, complete with all required installation accessories such as tees, bends, couplers, and saddles, for sub-main cables. The work shall include concealed or surface installation, conduit laying, excavation of soil where required, and reinstatement. Complete in all respects as per approved drawings and specifications.				
4.1	25 mm dia. uPVC conduit (for Telephone/Intercom Cable)	400	R.ft		
4.2	50 mm dia. uPVC Class 'D' conduit (for Power Cable)	400	R.ft		
4.4	Back Box: Supply and installation of 16 SWG sheet steel powder coated back box with brass earth terminal, complete in all respect.	10	No.		
			SUB TOTAL-04		
5.0	SWITCHES & SOCKET OUTLET				
5.1	Supply & Installation of following type switches / sockets as per design drawings & specification, complete in all respect. (Schneider E-series or Equivalent)				
a)	10A, Two gang switch unit.	2	No.		
b)	13A, Multi Pin switch socket unit.(Simplex).	3	No.		
			SUB TOTAL-05		
6.0	INTERIOR LIGHTING				
6.1	Supply Installation, Termination and Commission of following lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, electronic ballast, connector (Porcelain), supports, hanging				

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	& fixing materials(Such as Steel Rod/Chain), etc. including all mounting and installation accessories. Complete in all respects.				
a)	LED Surface mounted Downlight, light fixture (Surface Type), 16 watt (4000K)	5	No.		
			SUB TOTAL-06		
7.0	ESCAPE ROUTE LIGHTING				
7.1	Supply Installation, Testing and Commission of the following Emergency lighting fixtures as specified in the light fixtures schedule & specification complete with lamp, holders, 3 Hour Back up battery, connector (Porcelain), supports, hanging & fixing materials(Such as Steel Rod/Chain), etc. including all required mounting and installation accessories. Complete in all respects.				
a)	LED Emergency light fixture, Wall Mounted, 8 watt lamp self maintained type.	2	No.		
b)	LED Emergency Exit light fixture, 8 watt lamp with directional pictogram, self maintained type.	1	No.		
			SUB TOTAL-07		
8.0	CEILING FAN				
8.1	Supply Installation, Testing and Commission of following size of Ceiling fan, with all fixing accessories.				
a)	Ceiling Fan 56"	1	No.		
	SUB TOTAL-08				

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Item No	Description of Items	Qty.	Unit	Rate (Rs.)	Total Cost (Rs.)
9.0	VOICE OUTLET & CABLING				
	Supply, installation, testing & commissioning of following items for voice communication system including all material, labor, tools, installation accessories. Complete in all respects. Quantities for cables shown in BOQ are estimated and taken from drawings. Contractor is advised to take measurement at site before commencement of works.				
9.1	Single Face plate RJ-11 I/Os, including shutters, back boxes complete in all respect.	5	Nos.		
9.2	Supply and installation of 25mm dia PVC conduit with all accessories like line adapters etc., concealed / surface, complete in all respect as per drawing & specification.	60	R.ft		
9.3	Supply, installing, Testing & Commissioning of following multi pair telephone cable in already laid appropriate size of PVC conduit complete in all respects.				
a)	2 pair Cable	500	R.ft		
9.4	Supply and installation of 2 port Telephone / Intercom junction box.	1	No		
			SUB TOTAL-09		
10.0	ELECTRICAL HANDHOLE				
	Excavation, Concreting & making RCC Hand hole 1'-0" x 1'-0" x 2'-0" with heavy duty cover. Complete in all respect as per drawing or as directed by the Engineer.	1	Nos.		
			SUBTOTAL-10		
		GRAND TOTAL (1 to 10)			

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
1	<u>SECTION - A : STREET LIGHTING SYSTEM</u>				
1.1	Lighting Pole:				
	Supply and installation of hot-dipped galvanized inside and outside with 4mm wall thickness Octagonal steel poles. Including base plate, galvanized J bolt, nuts and washer, self locking inspection weather proof type door with rubber gasket, earthing lugs strip inside pole, special key, as per specification and details shown on the drawings. The product complying with the specification shall be used or approved by the Engineer ;				
a)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Single arm.	25	Each		
b)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Double arm.	2	Each		
c)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Triple arm.	3	Each		
d)	10 meter high Hot-dipped galvanized, Octagonal Steel Pole with Bracket for Flood lights.	2	Each		
1.2	Street Light Fixtures:				
	Supply, installation, testing and commissioning of LED street light fixture/Flood Light fixture. The fixture shall be IP 66 rated, non-corrosive die cast aluminum housing, spigot aluminum reflector, toughened glass cover, silicone rubber gasket. Complete in all respects as per specification and drawing. Light fixture sample to be submitted with technical data sheets and schedule of Technical data to be filled for each light fixture as mention in specification and to be submitted to the Consultant for the approval.				
a)	140 watts LED Lamp.	30	Each		
b)	250 watts LED, Flood Light fixture..	5	Each		
1.3	Cable Terminal Box				
	Supply, installation, testing and commissioning of following cable terminal box comprising with 2 Amp miniature circuit breaker (MCB) including 415 volt high voltage resistance Copper terminal, Complete in all respects as per specification and drawing.				
a)	Cable Terminal Box with 1x2 Amp miniature circuit breaker.	23	Each		
b)	Cable Terminal Box with 2x2 Amp miniature circuit breaker.	2	Each		
c)	Cable Terminal Box with 3x2 Amp miniature circuit breaker.	1	Each		
d)	Cable Terminal Box with 2x2 Amp miniature circuit breaker.	2	Each		
1.4	Cable between Pole Terminal box to light fixture:				

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	Supply, installation, testing and commissioning of 3 Core - 2.5 mm ² PVC/PVC Copper Conductor Cable between Pole Terminal box to light fixture, complete in all respects as per drawing and specifications.	1,500	R. ft		
1.5	Pole foundation:				
	Providing and Construction of Pole foundation in concrete class "A", reinforcement as per AASHTO M31, lean concrete etc., in accordance with specifications including excavation, backfilling and disposal of surplus earth. Complete in all respect as per drawing or as directed by the Engineer.	28	Each		
1.6	Street Light Control Panel:				
	Supply, installation, testing & commissioning of following outdoor type Street Light Control Panel (IP-65) rated, as per single line schematic diagram including provision of Pad Mounted Foundation, complete in all respects as per drawing and specification :-				
	SLCP-1 :	1	Each		
	INCOMING :				
	1 No 50A TP MCCB (Isc: 15 KA)				
	OUTGOING :				
	09 Nos 16A TP MCCB (Isc:10 KA)				

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
	1 No. Surge Protector (15-20 kA)				
	1 No. 3 Phase digital Multimeter				
	1 No. Photo sensor with manual bypass timer contactor arrangement.				
1.7	LV Cable for Street Lighting:				
	Supply, laying, testing and commissioning including termination at both ends of Cu multicore 600/1000 voltage grade, Cu/PVC / SWA / PVC for street light cable laid directly in the already excavated trench from nearest source to street light control panel and street light control panel to street light Terminal box including supply and installation of all fixing and termination material, brass cable glands, ferrules, lugs, ties, accessories, etc., Complete in all respect as per drawing and specification.				
a)	4C - 25 mm ² PVC/SWA/PVC	2,300	R. ft		
b)	4C - 16 mm ² PVC/SWA/PVC	700	R. ft		
1.8	Main LV Cable for Street Light Control Panel from Main Feeder Panel:				
	Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required in raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc. complete in all respect as per drawing & Specification.				
a)	4C - 35 mm ² PVC//PVC	40	R. ft		
1.9	Excavation and backfilling for Street Lighting Cable:				
	Excavation and backfilling of every type of trench in any type of soil within the project area for laying of street light cables, including sand cushion, protective bricks, warning tape and excavated earth compaction in layers not exceeding 9 inch thick, site cleaning etc. as per drawing and specification or as directed by the Engineer.				
a)	Excavated earth back filling and compaction	13,000	Cu.ft		
b)	River Sand (Bed and cover)	400	Cu.ft		
c)	Bricks (225 x 112 x 75) mm	2,000	Sq.ft		
d)	Warning Tape with 300 mm width and 0.5 mm thickness	3,000	R.ft		
1.10	Earthing Cable:				
	Supply, laying, testing and commissioning of single core copper wire, as earth protective conductor (ECC), run along with the cable, including all jointing and termination accessories, cable lugs, ferrules, etc. Complete in all respects as per drawing and				

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	specification.				
a)	1C - 16 mm ² PVC	400	R. ft		
b)	1C - 10 mm ² PVC	500	R. ft		
1.11	Earth Rod Installation for Light Pole:				
	Supply, installation, testing and commissioning of earthing system with 3 meter long & 20 mm dia earth Copper rod at both end of each circuit of street light, including boring up to (12 ft) depth or as required to achieve an earth resistance of ≤ 3 ohms including 16 sq mm single core PVC insulated wire from earth rod to lighting pole, marconite concrete, drilling in ground etc., complete in all respect as per specification and drawing or as directed by Engineer.	28	Each		
1.12	Earth Rod Installation for SLCP:				
	Supply, installation, testing and commissioning of earthing system as a protective Earthing for SLCP with 3 meter long & 20 mm dia Earth Copper rod including PVC insulated Copper Earth conductor 2 x 35 sq.mm in 50 mm dia G.I. pipe, up to Earth connecting point, inspection chamber, marconite concrete, drilling etc., to achieve less than 3 ohms specified Earthing results. complete in all respect as per drawing and specification or as directed by Engineer.	1	Each		

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
2	<u>SECTION - B : CCTV SYSTEM.</u>				
	Supply, installation, testing and commissioning of CCTV outdoor type as per technical specifications / Standards, comprising of following, interconnected with auxiliary equipment. Complete in all respects, in accordance with approved drawings and specifications, and to the				
2.1	4MP EXIR VF Network Bullet Camera, 1/3" Progressive Scan CMOS, 2.8-12 MM Motorized VF Lens, BLC up to 30 m IR distance, SD Card support, 3D DNR, POE, H.265, IP67	22	Each		
2.2	Outdoor IP-based 4 MP IR PTZ surveillance Camera system suitable for long range monitoring up to 1 km, complete in all respects,	2	Each		
2.3	32 channel 4K embedded NVR with H.265 Decoding, 4 Sata Ports, 2 HDMI/VGA Port, 320 MBPS Bandwidth Network Throughput, 16 Alarm I/P & 6 O/P, 16 POE Ports, ONVIF with 30 days recording @30FPS & H.265	2	Each		
2.4	Seagate, 20 TB 3.5" SATA HARD Drive 256 MB Cache for 90 Days Storage.	10	Each		
2.5	50 inch LED Color TV full HD wall mounted with bracket & accessories	1	Each		
2.6	Patch Panel CAT-6, 12 PORTS (LOADED)-568 A/B with cable management tray, rear, size 1U - SIZE 1U - ACTASSI	1	Each		
2.7	Patch Panel CAT-6, 24 port (Loaded)-568 A/B with cable management Tray, Rear, size 1U - ACTASSI	2	Each		
2.8	Patch Cord for camera, 3ft each	25	Nos		
2.9	Core I7-PC having minimum 3.4 GHZ Processor, 16 GB RAM, 2TB HDD, GBE Network Card, Licensed WINDOWS 10 OS Keyboard, Mouse & associated accessories.	1	Each		
2.10	24-Port GIGABIT Smart Switch with 16 GIGABIT PoE Port & 2 COMBO SFP Port, 30W POE capacity for each Port (TP Link / Ruijie).	2	Each		
2.11	Power Supply for Industrial Switch 75W 48V DC Single Output	1	Each		
2.12	Industrial 4-Port 10/100/1000T POE & 2 PORT 100/1000X SFP Ethernet Switch	2	Each		
2.13	2-core single-mode fiber optic cable as a backbone from existing location to IT rack located in Control Room.	150	R.ft		
2.14	CAT-6, POE Cable from IT rack to each Camera.	5,000	R.ft		
2.15	Supply, installation, testing and commissioning of Pole mounted IP 65 rated Enclosure Box 3' x 3" with 3 Nos I/O switch (Cat 6 RJ45) as per drawing.	25	Each		
2.16	Supply, installation, testing and commissioning of Pole mounted IP 65 rated Enclosure Box for POE switch as per drawing.	2	Each		

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2.17	42 U Server rack Floor standing complete with all accessories such as adjustable mounting rails, vertical & horizontal cable managers, rack-mount PDU, cooling fan unit, fixed shelf, earthing kit, cable entry provisions (top & bottom), levelling feet, and all necessary mounting hardware, fully installed and commissioned.	1	No		
2.18	2 KVA On-Line UPS With Batteries	1	No		
2.19	4 Port ODF with 4 nos. of fiber patch cord 1 meter	1	No		
2.20	Programming, testing & commissioning of the system	1	Job		
3.0	Underground uPVC Class D Conduit for CAT6 Camera Cable Laying				
	Supply and installation of uPVC Class 'D' conduit of specified diameter for underground CAT6 Camera Cable Laying, including all fittings (tees, bends, couplers, etc.), trenching, sand bedding, backfilling, compaction, and complete installation as per drawings and specifications.				
a)	50 mm dia. uPVC conduit	2,000	R.ft		
b)	75 mm dia. uPVC Class 'D' conduit	1,000	R.ft		

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
4.0	RCC Handhole				
	Construction of 2' x 2' RCC handhole with suitable cover and frame for underground CAT6 camera cable, including excavation, sand bedding, concrete casting, cable entry/exit openings with bushings, backfilling, leveling, and all civil works as per approved drawings and specifications.	13	Nos.		
		SUB TOTAL - 02 to 04			
5.0	<u>SECTION - C : Pedestrian Access Control System (PACS)</u>				
	Supply, installation, testing, and commissioning of following Pedestrian Access Control System , comprising access controller hardware, card/finger print/biometric readers, control software, power supply, cabling, and all necessary accessories, complete in all respects as per approved drawings, specifications, and instructions of the Engineer / Consultant.				
5.1	Facial Recognition Cameras (FRC)				
	Supply, installation, testing, and commissioning of 4 MP Outdoor Facial Recognition Camera dome type with varifocal lens (6–22 mm), AI analytics, True WDR, IR range 30 m, H.265 video compression, PoE, IK10 & IP67 protection, including power adapter, junction box, and mounting bracket. Complete with all power/control cabling, installation, and commissioning as per approved drawings, specifications or as directed by the Engineer/Consultant.	4	Nos		
5.2	Data Network for Pedestrian Access Control System (PACS)				
	Supply, Installation, testing and commissioning of following Items for the PACS Data Networking System;	1	Job		
a)	Data Cabinet:				
	Refer to item # 2.16 (already included)				
b)	Network Switch (Indoor)				
	Indoor network switch rack mounted, complete as specified below;				
	• 24 Gigabit Ethernet (10/100/1000 Mbps) downlink ports.				
	• 2 SFP+ uplink ports				
	• Management Interface: Web, POE Enabled				
c)	Network Cable				
	Category: CAT-6, Type: UTP, Max Bandwidth support :1G				
5.3	Visitor Management System (VMS)				

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	Supply, installation, testing, and commissioning of a complete Visitor Management System (VMS), fully integrated with the centralized Access Control System for both pedestrian and vehicular access. The scope shall include all associated cabling, mounting hardware, interfacing, software configuration, system integration, testing, and final commissioning, in accordance with the approved drawings, project specifications, and engineer's instructions. which included the following items and all required items to complete the job either mentioned or not but required to the job successfully. contractor should include these items rate in the quoted price. complete in all respect.				
a)	E-Tags: Compact size, Improved sensitivity, Laser-engraved card number to effectively prevent wear or fading, EV adhesive, enhanced UV resistance, 860~960MHz, ISO 18000-6C or EPC Class1 Gen2, IC of NXP U9, Marking of EPC / WG55 / 32 bit, can do Read and Write Function, Comparison of reading distance must be L99 x 150% or L99 x 100%, Antena Material made of Copper Foil, should have Logo printed on the Tags. Anti theft material.	500	Nos		

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b)	E-Tags Encoder; with Light weight and potable, compliant with EPC Gen 2 (ISO 18000-6C) standard, built-in 2.2 inches LCD screen and 23dBm RF module with 0.54dBi gain antenna, user can get the electric label or particular card information from LCD screen directly, Built-in Lithium battery and charging compatible with mobile devices, can stored 19,440 sets data available, frequency should be 902-928 MHz, reading range must be less than 50 cm, can only do Read Only function, can support H3,4 chip tags can be used Vehicle tags and Hand-held tags, have Watchdog function, 12VDC power Supply. Must be FCC ID Certified, should have GDRP compliance	1	Nos		
		SUB TOTAL- 05			
6.0	<u>SECTION - D : Vehicle Access Control System (VACS)</u>				
	Supply, installation, testing, and commissioning of a following complete Vehicle Access Control System (VACS) to provide automated monitoring and control of vehicle entry and exit points, enhancing security, safety, and traffic management within the facility, complete in all respects in accordance with the approved drawings, specifications, and instructions of the Engineer/Consultant. The system shall comprise, but not be limited to, the following:				
6.1	Road Blocker				
	Shallow Mount Road Blocker: Supply, installation, Shallow Mount Hydraulic Road Blocker (4.2m blocker length, 120cm raised height, when opened, 40cm blocker depth and lower times 3-5 sec, Material ST 37, Color RAL 1028 yellow/RAL 9005 black, Road blocker width 200cm to 600cm, should have test cleared Crash Test till PAS68: V7500{N3}/80/90:0.0/0, DOSSD-STD-02.01, A03/2003/L3, must have 2 units of 10m hydraulic hoses, have certification including K12, M50, ASTM F2656, IWA14-1, 50 tons of load per axle resistance, heavy duty structure, S235 type of steel must be used, hinges made of Heavy duty with hardened steel, 380 V, 3 Phase, 50-60 Hz (or 220 V/ 440 V etc., three phase, 50-60 Hz optional by a transformer), in case of power failure Manual hand pump, (or Hydraulic accumulator, DC motor and batteries or UPS (optional)), in emergency 1.5 seconds (optional), Raise, lower, emergency stop, key operated, 'keyboard in use' light indicator, proximity sensors to sense the position of Blocker,	2	No s.		

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	dual vehicle safety loop detector, motor power of up to 4KW and 1500 rpm, can be operated by desktop keyboard, can integrate with Red & Green Traffic Lights, Must be Certified with following;- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1Should have EU, EC and EN Certification. include all civil works, complete in all respects, as per approved drawings, project specifications or as directed by the Engineer/Consultant.				
6.2	Manual Boom Barrier				
	Supply and installation of manual K-rated crash-tested Boom Barrier of specified length below with 4" dia (3 mm thick) boom arm and 3" dia (2.45 mm thick) support post, heavy-duty S235 steel construction, complete with manual lifting and locking mechanism, hot-dip galvanized and painted (RAL 1028 Yellow / RAL 9005 Black), The scope shall include civil foundation works, anchor bolts, installation, alignment, primer and finish painting, and complete erection, ensuring proper manual operation and structural stability and compliant as per PAS68 / K12 / M50 / ASTM F2656 / IWA14-1. Complete in all respects as per approved drawings, specifications, and as directed by the Engineer or Consultant.				
a)	23 Feet Clearance Boom Barrier	1	No		
b)	Same as the above item 6.2 (a), but dismantling and reinstallation of the existing Boom manual Barrier at the new location (car lane), including all required civil works. Complete in all respects as per approved drawings, specifications, and as directed by the Engineer/Consultant.	1	Job		

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
6.3	Electromechanical Boom Barrier				
	Supply, installation and commissioning heavy Duty 2-4 meters Length Automatic Parking Barrier with Flashing Light, 220 Volt power, 1 Phase , 50-60 Hz, 3-4 sec operating time, folding arm, Environmental durability with Galvanized steel, RAL7012 powder coated , furnaced, must have PLC controller integrated, if power failure gear can be released by Allen Key, can be raised or lowered by a push button operations, must have I/O's to connect any card reader, extra override keyboard etc. later on, 550 Watt or Motor Power, -25 °C and +65 °C, %95 non-condensing humidity, can adjust 5sec delay time, IP55 rated, IP67 rated (control cabinet), Arm is aluminum with a special elliptical like cross-section design , Low power consumption and silent running, Compatible with all access control systems, Red & Green LED Light on the Boom, Flashing Light while it moves, Safety photocells, pneumatic edge sensor, dual vehicle safety loop detector, UPS with separate cabinmate (optional) Dual channel Loop Detector. The make shall be Optima B300 or approved by the Consultant/Client. Complete in all respect including Power Supply Control Cable and Cat 6 cable from control Room to Electromechanical Boom Barrier as per manufacturer recommendation. Must be Certified with following;- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6 1Should have EU, EC and EN Certification.				
a)	Electromechanical Boom Barrier for Car with 9 ft Boom length	1	No		
b)	Electromechanical Boom Barrier for Truck with 18 ft Boom length	1	No		

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c)	Bike Barriers (2x Bike Barrier for Entry and 1x Bike Barrier for Exit) Supply, installation and commissioning heavy Duty 2 ft Length Automatic Barrier with Flashing Light, 220 volts Power, 3-4 sec operating time, 220 Volt power, 1 Phase , 50-60 Hz, 3-4 sec operating time, folding arm, Environmental durability with Galvanized steel (DX51D+Z) plate , RAL7012 powder coated , furnaced, if power failure gear can be released by Allen Key, minimum speed of 3 seconds, can be raised or lowered by a push button operations, Enough I/O's to connect any card reader , extra override keyboard etc. later on, 550 Watt or Motor Power, -25 °C and +65 °C, %95 non-condensing humidity. Flashing Light, 220 Volt power, 1 Phase , 50-60 Hz, 3-4 sec operating time, folding arm, Environmental durability with Galvanized steel, RAL7012 powder coated , furnaced, must have PLC controller integrated, if power failure gear can be released by Allen Key, can be raised or lowered by a push button operations, must have I/O's to connect any card reader, extra override keyboard etc. later on, 550 Watt or Motor Power, -25 °C and +65 °C, %95 non-condensing humidity, can adjust 5sec delay time, IP55 rated, IP67 rated (control cabinet), Arm is aluminum with a special elliptical like cross-section design , Low power consumption and silent running, Compatible with all access control systems, Red & Green LED Light on the Boom, Flashing Light while it moves, Safety photocells, pneumatic edge sensor, dual vehicle safety loop detector, UPS with separate cabinmate (optional) Dual channel Loop Detector. The make shall be Optima B300-ART or approved by the Consultant/Client. Complete in all respect including supply Power Supply Control Cable and Cat 6 cable from control Room to Bike Barrier as per manufacturer recommendation. Must be Certified with following;- ISO 9001:2015- TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1Should have EU, EC and EN Certification	3	Nos		

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
6.4	UHF RFID Reader				
	Supply, installation, and commissioning of a UHF Reader including all accessories, with the following technical specifications. Complete in all respect including Power Supply Control Cable and Cat 6 cable from control Room to UHF Reader & Signal as per manufacturer recommendation. · Freq: 125 KHz and 902- 928 MHz, Standard EM Standard, Range 6 meter, IP65, Housing ABS, ISO18000-6C· Standard - ISO18000-6C (EPC Gen2)· Protection - IP65. Housing Material - ABS/Ivory- Support Tags - H3/H4/H9/U9 chip tags can be used Vehicle tags and Hand-held tags- Communication Interface: Wiegand or RS485- Baud Rate of 9600 bps-Reading Range can be 4-6 Meters and as long as 15m (The power consumption is adjustable from 10%~100%, the reading range will increase/decrease by different power consumption.)Have Read Only Function with Watchdog Power: Less than 18W, with 12VDC Power Supply and less than 1A- 1 Bi-color LED Light Indicator- Can be operational in -20°C to +55°C temperature can be integrated with IR or Induction coil, modulator scheme PR-ASK, ASK, eission power of 24.9 dBm (adjustable), receiving sensitivity of -85dBm, antenna connection 50 ohm UFL, and antenna gain of 11 dbi. Must be FCC ID Certified, should have GDRP compliance Complete in all respects as per approved drawings, specifications, and instructions of the Engineer/Consultant. The System Components shall be as follow:	3	Nos		
a)	02 Nos for vehicle entry				
b)	01 No for vehicle exit				
6.5	ANPR Cameras				
	Supply, installation, testing, and commissioning of Automatic Number Plate Recognition (ANPR) camera system, comprising high-resolution IP camera with built-in ANPR analytics, IR illumination for day/night operation, suitable lens for lane coverage, weatherproof housing (IP66 or better), mounting brackets, and all associated accessories. The scope includes necessary power supply, data cabling, integration with access control/parking management system, configuration, software setup, testing, and commissioning with all civil works.	6	Nos		



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	Complete in all respects as per specifications, drawings, and as directed by the Engineer/Consultant.				

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
6.6	Line Scan UVSS				
	Supply, installation, testing, and commissioning of Fixed Under Vehicle Surveillance System (UVSS) for road security, including Charge-Coupled Device (CCD). Complete in all respects including Power Supply Control Cable and Cat 6 cable from control Room to Line Scan UVSS as per manufacturer recommendation. With following including all necessary civil works, integration with other systems, and making the system fully operational. Material: Stainless Steel. Waterproof Grade: IP68, 50T. Image Resolution: 12000 × 6144; Camera Resolution: 5000 × 2048 pixels, Color camera 5mp, Image ata Interface Gigabit Ethernet (1000 Mbit/s), Frame Rate per second 30 fps, Focal length f=5 mm.. Image Type: Color. Power Supply: 24 VDC, 3 A. Signal-to-Noise Ratio: 48 dB. Features: AI-based Foreign Object Detection, ANPR Camera - System Memory 2 x 204-pin DDR3-1333/1600mhz SO-DIMM, up to 16GB.- Maximum diameter ratio is F= 1:2.8 ~16.-Power Requirements: 12-24V AC/DC +/- 15% 1.5VA max @230 V-Output Relay: N.O contacts (fail-safe in presence mode) or N.C. model-Material: High Heat ABS blend, St37 Steel & Stainless Steel top cover with thickness of 5mm- Environmental Conditions and Power Requirements: - 20°C/50°C & 12-24 V DC with Self-cleaning (optional) system Taking a picture of the underside of the vehicle with a high resolution automatic digital area scanner camera and displaying it on the screen. Alert on the monitor when a suspicious object is detected under the vehicle. Ability to scan vehicles moving at 0-50 km/h from both sides in two directions. Easy integration with many physical security products such as road blocks, barriers and license plate recognition systems. The ability to track the information recorded from the web interface from anywhere in the world. Must be Certified with following;- ISO 9001:2015-TS-EN ISO 12100:2010- TS-EN ISO 13732-1- TS-EN ISO 13850- TS-EN ISO IEC 6100-6-1Should have EU, EC and EN Certification. Complete in all respect as per drawing & Specification.	2	Job		
6.7	Tire Killer, at Exit Points				

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	Supply, installation, of Heavy Duty Manual one way tire killer size: 20 Feet, 6mm thick MS section, 8mm thick MS blades, Gravity based operation, Maintenance free and spring free operation, Independent operation of each spike, Vertical height of spike is 3.5 inches from surface, Individually replaceable MS blades, Flat bar to manually lock spikes in the down position, 30 ton loading capacity, Self-balancing mechanism, Space between each spike 3.5 inches, Top removable bar to close the tire killer to use the tire killer for entry.	1	Job		
6.8	MCP Door Controller				
	Supply, installation, testing, and commissioning of Electrically operated MCP Door Controller at exit site.	2	Nos		
6.9	Supply, installation, testing & commissioning of motorized gate system (gate will be provided by civil contractor) along with required size single or three phase motor 50 Htz as required for 800 kg each leaf of door and all other required control cables, controller, sensors, control switch and other required installation accessories to complete the job, either these items are mentioned or not in the description must be included in the rate. this gate must be oped and closed from the control room by manual operation. This system is required on both gates, 2 Nos entry and 2 Nos exit gates as per given civil design and weight of gate (1600 kg for each gate) in the civil boq. this item must complete in all respect with required complete motorized controlled gate system. gate must be opened 90 Degree and IP-55 weather resistant. operating temperature is 15 degree to 50 degree Celsius	2	Jobs		

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
6.10	Underground uPVC Class D Conduit for Control Cable Laying				
	Supply and installation of uPVC Class 'D' conduit of specified diameter for underground control cabling, including all fittings (tees, bends, couplers, etc.), trenching, sand bedding, backfilling, compaction, and complete installation as per drawings and specifications.				
a)	50 mm dia. uPVC class D conduit	1,500	R.ft		
b)	70 mm dia. uPVC Class 'D' conduit	300	R.ft		
		SUB TOTAL - 06			
7.0	<u>SECTION - E : MAIN FEEDER PILLAR & ALLIED WORKS</u>				
7.1	Feeder Pillar-1				
	Supply, installation, testing & commissioning of following outdoor type Main Feeder Panel (IP-65) rated, as per single line schematic diagram including provision of Pad Mounted Foundation, complete in all respects as per drawing and specification :-	1	No		
	INCOMING :				
	02 No 250A TP MCCB (Isc: 25 KA)				
	OUTGOING :				
	01 No 40A TP MCCB (Isc:15 KA)				
	02 Nos 60A TP MCCB (Isc:15 KA)				
	01 Nos 150A TP MCCB (Isc:15 KA)				
	01 No 250A ATS				
7.2	Main LV Cable for Feeder Panel (FP-1) from Existing Source:				
	Supply ,Installation, connection, testing & commissioning of following Main, Sub-main 600V /1000V grade Cu. cables as required in raceway or laid direct underground as per drawings and specifications including cable lugs, glands, labels, and fixing accessories etc., complete in all respect as per drawing & Specification.				
a)	4C - 70 mm ² Cu/PVC/PVC + 1c- 35 mm ² as ECC	50	R.ft		
b)	4C - 120 mm ² Cu/PVC/PVC + 1c- 70 mm ² as ECC	450	R.ft		
7.3	Excavation and backfilling for FP-1 Main Cable:				
	Excavation and backfilling of every type of trench in any type of soil within the project area for laying of street light cables, including sand cushion, protective bricks, warning tape and excavated earth compaction in layers not exceeding 9 inch thick, site cleaning etc. as per drawing and specification or as directed by the Engineer.				

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a)	Excavated earth back filling and compaction	2,000	Cu.ft		
b)	River Sand (Bed and cover)	500	Cu.ft		
c)	Bricks (225 x 112 x 75) mm	3,000	Sq.ft		
d)	Warning Tape with 300 mm width and 0.5 mm thickness	500	R.ft		
7.4	Underground uPVC Class D Conduit for Main Cable Laying				
	Supply and installation of uPVC Class 'D' conduit of specified diameter for underground CAT6 Camera Cable Laying, including all fittings (tees, bends, couplers, etc.), trenching, sand bedding, backfilling, compaction, and complete installation as per drawings and specifications.				
a)	150 mm dia. uPVC Class 'D' conduit	400	R.ft		

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Item No.	Description Of Items	Qty.	Unit	Rate (Rs.)	Amount (Rs.)
7.5	Earth Rod Installation for FP-1:				
	Supply, installation, testing, and commissioning of a complete earthing system comprising a 3 m long, 20 mm diameter copper earth rod, including boring up to (12 ft) depth or as required to achieve an earth resistance of ≤ 3 ohms. The scope includes provision of 16 sq.mm bare copper earthing conductor from the earth rod to FP-1, with marconite conductive backfill compound, necessary excavation and drilling, clamps/connectors, and all associated accessories, complete in all respects as per specifications and drawings and as directed by the Engineer.	1	Each		
7.6	RCC Man Hole				
	Construction of 3' x 3' x 3' RCC hand hole with suitable cover and frame for underground CAT6 camera cable, including excavation, sand bedding, concrete casting, cable entry/exit openings with bushings, backfilling, leveling, and all civil works as per approved drawings and specifications.	7	Nos.		
		SUB TOTAL- 07			
	Grand Total (Sub Total 01 to 07)				

SECTION VII – GENERAL CONDITIONS OF THE CONTRACT

SECTION VII – GENERAL CONDITIONS OF THE CONTRACT**1. Definitions**

1.1. The following words and expressions shall have the meanings hereby assigned to them:

- a) **“Authority”** means Public Procurement Regulatory Authority.
- b) The **“Arbitrator”** is the person appointed with mutual consent of both the parties, to resolve contractual disputes as provided for in the General Conditions of the Contract **GCC Clause 31** hereunder.
- c) The **“Contract”** means the agreement entered into between the Procuring Agency and the Supplier, as recorded in the Contract Form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- d) The **“Commencement Date”** is the date when the Supplier shall commence execution of the contract as specified in the **SCC**.
- e) **“Completion”** means the fulfillment of the related services by the Supplier in accordance with the terms and conditions set forth in the contract.
- f) **“Country of Origin”** means the countries and territories eligible under the PPRA Rules 2004 and its corresponding Regulations as further elaborated in the **SCC**.
- g) The **“Contract Price”** is the price stated in the Letter of Acceptance and thereafter as adjusted in accordance with the provisions of the Contract.
- h) **“Defective Goods”** are those goods which are below standards, requirements or specifications stated by the Contract.
- i) **“Delivery”** means the transfer of the goods from the supplier equipment, machinery, and /or other materials which the Supplier is required to supply to the Procuring Agency under Contract.
- j) **“Effective Contract date”** is the date shown in the Certificate of Contract Commencement issued by the Procuring Agency upon fulfillment of the conditions precedent stipulated in **GCC Clause 3**.
- k) **“Procuring Agency”** means the person named as Procuring Agency in the **SCC** and the legal successors in title to this person, procuring the Goods and related service, as named in **SCC**.
- l) **“Related Services”** means those services ancillary to the delivery of the Goods, such as transportation and insurance, and any other incidental services, such as installation, commissioning, provision of technical assistance, training, initial maintenance and other such obligations of the Supplier covered under the Contract.
- m) **“GCC”** means the General Conditions of Contract contained in this section.
- n) **“Intended Delivery Date”** is the date on which it is intended that the Supplier shall affect delivery as specified in the **SCC**.
- o) **“SCC”** means the Special Conditions of Contract.
- p) **“Supplier”** means the individual private or government entity or a combination of the above whose Bid to perform the contract has been accepted by the Procuring Agency and is named as such in the Contract Agreement, and includes the legal successors or permitted assigns of the supplier and shall be named in the **SCC**.
- q) **“Project Name”** means the name of the project stated in **SCC**.
- r) **“Day”** means calendar day.

	s) "Eligible Country" means the countries and territories eligible for participation in accordance with the policies of the Federal Government. t) "End User" means the organization(s) where the goods will be used, as named in the SCC. u) "Origin" means the place where the Goods were mined, grown, or produced or from which the Services are supplied. Goods are produced when, through manufacturing, processing, or substantial and major assembly of components, a commercially recognized new produce results that is substantially different in basic characteristics or in purpose or utility from its components. v) "Force Majeure" means an unforeseeable event which is beyond reasonable control of either Party and which makes a Party's performance of its obligations under the Contract impossible or so impractical as to be considered impossible under the circumstances. For the purposes of this Contract, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of a Party, and which makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances. and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood, epidemics, or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent), confiscation or any other action by Government agencies. w) "Specification" means the Specification of the Goods and performance of incidental services in accordance with the relevant standards included in the Contract and any modification or addition made or approved by the Procuring Agency. x) The Supplier's Bid is the completed Bid document submitted by the Supplier to the Procuring Agency.
2.Application and Interpretation	2.1 These General Conditions shall apply to the extent that they are not superseded by provisions of other parts of the Contract. 2.2 In interpreting these Conditions of Contract headings and marginal notes are used for convenience only and shall not affect their interpretations unless specifically stated; references to singular include the plural and vice versa; and masculine include the feminine. Words have their ordinary meaning under the language of the Contract unless specifically defined. 2.3 The documents forming the Contract shall be interpreted in the following order of priority: (1) Form of Contract, (2) Special Conditions of Contract, (3) General Conditions of Contract, (4) Letter of Acceptance, (5) Certificate of Contract Commencement (6) Specifications (7) Contractor's Bid, and

	(8) Any other document listed in the Special Conditions of Contract as forming part of the Contract.
3. Conditions Precedent	3.1 Having signed the Contract, it shall come into effect on the date on which the following conditions have been satisfied: - i. Submission of performance Security (or guarantee) in the form specified in the SCC; ii. Furnishing of Advance Payment Unconditional Guarantee. 3.2 If the Condition precedent stipulated on GCC Clause 3.1 is not met by the date specified in the SCC this contract shall not come into effect; 3.3 If the Procuring Agency is satisfied that each of the conditions precedent in this contract has been satisfied (except to the extent waived by him, but subject to such conditions as he shall impose in respect of such waiver) he shall promptly issue to the supplier a certificate of Contract commencement, which shall confirm the start date.
4. Governing Language	4.1 The Contract as all correspondence and documents relating to the contract exchanged by the Supplier and the Procuring Agency shall be written in the language specified in SCC . Subject to GCC Clause 3.1 , the version of the Contract written in the specified language shall govern its interpretation.
5. Applicable Law	5.1 The contract shall be governed and interpreted in accordance with the laws of Pakistan, unless otherwise specified in SCC.
6. Country of Origin	6.1 The origin of Goods and Services may be distinct from the nationality of the Supplier.
7. Standards	7.1 The Goods supplied under this Contract shall conform to the standards mentioned in the Technical Specifications, and, when no applicable standard is mentioned, the American Standards (such as ACI, IEEE, ASME, etc.) or the Pakistani standards such as PSQCA Such standards shall be the latest issued by the concerned institution.
8. Use of Contract Documents and Information; Inspection and Audit by Government of Pakistan	8.1 The Supplier shall not, without the Procuring Agency's prior written consent, disclose the Contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the Procuring Agency in connection therewith, to any person other than a person employed by the Supplier in the performance of the Contract. Disclosure to any such employed person shall be made in confidence and shall extend only as far as may be necessary for purposes of such performance. 8.2 The Supplier shall not, without the Procuring Agency's prior written consent, make use of any document or information enumerated in GCC Clause 7.1 except for purposes of performing the Contract. 8.3 Any document, other than the Contract itself, enumerated in GCC Clause 7.1 shall remain the property of the Procuring Agency and shall be returned (all copies) to the Procuring Agency on completion of the Supplier's performance under the Contract if so required by the Procuring Agency. 8.4 The Supplier shall permit the Government of Pakistan or / and donor agencies involved in financing the project to inspect the Supplier's accounts and records relating to the performance of the Supplier and to have them audited by auditors appointed by the Government of Pakistan or / and the appropriate donor agencies, if so required by the Government of Pakistan or / and the appropriate donor agencies.

9. Patents and Copy Rights	9.1 The Supplier shall indemnify the Procuring Agency against all third-party claims of infringement of patent, trademark, or industrial design rights arising from use of the Goods or any part thereof in Pakistan. 9.2 The patent right in all drawings, documents, and other materials containing data and information furnished to the Procuring Agency by the Supplier herein shall remain vested in the supplier, or, if they are furnished to the Procuring Agency directly, or through the Supplier by any third party, including suppliers of materials, the patent right in such materials shall remain vested in such third party.
10. Performance Security (or Guarantee)	10.1 The Performance Security (or Guarantee) shall be provided to the Procuring Agency no later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank or surety acceptable to the Procuring Agency, and denominated in the types and proportions of the currencies in which the Contract Price is payable as specified in the SCC. 10.2 The proceeds of the Performance Security (or Guarantee) shall be payable to the Procuring Agency as compensation for any loss resulting from the Supplier's failure to complete its obligations under the Contract. 10.3 The Performance Security (or Guarantee) shall be in one of the following forms a) A bank guarantee, an irrevocable letter of credit issued by a reputable bank, or in the form provided in the Bidding Documents or another form acceptable to the Procuring Agency; or b) A cashier's or certified check. 10.4 The performance security (or guarantee) will be discharged by the Procuring Agency and returned to the Supplier not later than thirty (30) days following the date of completion of the Supplier's performance obligations under the Contract, including any warranty obligations, unless otherwise specified in SCC.
11. Inspection and Testing	11.1 The Procuring Agency or its representative shall have the right to inspect and /or to test the Goods to confirm their conformity to the Contract specifications at no extra cost to the Procuring Agency. SCC and the Technical Specifications shall specify what inspections and tests the Procuring Agency shall notify the Supplier in writing or in electronic forms that provide record of the content of communication, in a timely manner, of the identity of any representatives retained for these purposes. 11.2 The inspections and tests may be conducted on the premises of the Supplier or its subcontractor(s), at point of delivery, and/or at the Goods' final destination. If conducted on the premises of the Supplier or its subcontractor(s), all reasonable facilities and assistance, including access to drawings and production data, shall be furnished to the inspectors at no charge to the Procuring Agency. 11.3 Should any inspected or tested Goods fail to conform to the Specifications, the Procuring Agency may reject the Goods, and the Supplier shall replace the rejected Goods to meet specification requirements free of cost to the Procuring Agency. 11.4 The Procuring Agency's right to inspect, test and, where necessary, reject Goods after the Goods' arrival in the Procuring Agency's country shall in no way be limited or eared by reason of the Goods having previously been

	inspected, tested, and passed by the Procuring Agency or its representative prior to the Goods' shipment from the country of origin. 11.5 Nothing in GCC Clause 10 shall in any way release the supplier from any warranty or other obligations under this Contract.
12. Packing	12.1 The supplier shall provide such packing of the Goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the Contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing case size and weights shall take into consideration, where appropriate, the remoteness of the Goods final destination and the absence of heavy handling facilities at all points in transit. 12.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the Contract, including additional requirements, if any, specified in SCC, and in any subsequent instructions ordered by the Procuring Agency.
13. Delivery and Documents	13.1 Delivery of the Goods shall be made by the Supplier in accordance with the terms specified in the Schedule of Requirements. The details of shipping and or other documents to be furnished by the Supplier as specified in SCC. 13.2 For purposes of the Contract, "EXW", "FOB", "FCA", "CIF", "CIP," and other trade terms used to describe the obligations of the parties shall have the meanings assigned to them by the current edition of INCOTERMS published by the International Chamber of Commerce, Paris. 13.3 Documents to be submitted by the Supplier are specified in SCC.
14. Insurance	14.1 The Goods supplied under the Contract shall be fully insured in a freely convertible currency against loss or damage incidental to manufacture or acquisition, transportation, storage, and delivery in the manner specified in the SCC.
15. Transportation	15.1 Where the Supplier is required under Contract to deliver the Goods FOB, transport of the Goods, up to and including the point of putting the Goods on board the vessel at the specified port of loading, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price. Where the Supplier is required under the Contract to deliver the Goods FCA, transport of the Goods and delivery into the custody of the carrier at the place named by the Procuring Agency or other agreed point shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price. 15.2 Where the Supplier is required under Contract to deliver the Goods CIF or CIP, transport of the Goods to the port of destination or such other named place of destination in Pakistan, as shall be specified in the Contract, shall be arranged and paid for by the Supplier, and the cost thereof shall be included in the Contract Price 15.3 Where the Supplier is required under the Contract to transport the Goods to a specified place of destination within Pakistan, defined as the Project Site, transport to such place of destination in Pakistan, including insurance and storage, as shall be specified in the Contract, shall be arranged by the Supplier, and related costs shall be included in the Contract Price.
16. Related Services	16.1 The Supplier may be required to provide any or all of the following services, including additional services, if any, specified in SCC:

	a) Performance or supervision of on-site assembly, Installation Commissioning and/or start-up of the supplied Goods; b) Furnishing of tools required for assembly and/or maintenance of the supplied Goods; c) Furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied Goods; d) Performance or supervision or maintenance and/or repair of the supplied Goods, for a period of time agreed by the parties, provided that this service shall not relieve the Supplier of any warranty obligations under this Contract; and e) Training of the Procuring Agency's personnel, at the Supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied Goods.
	16.2 Prices charged by the Supplier for related services, if not included in the Contract Price for the Goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services.
17. Spare Parts	17.1 As specified in SCC, the Supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the Supplier: a) Such spare parts as the Procuring Agency may elect to purchase from the Supplier, provided that this election shall not relieve the Supplier of any warranty obligations under the Contract; and b) In the event of termination of production of the spare parts: i) advance notification to the Procuring Agency of the pending termination, in sufficient time to permit the Procuring Agency to procure needed requirements; and ii) following such termination, furnishing at no cost to the Procuring Agency, the blueprints, drawings, and specifications of the spare parts, if requested.
18. Warranty / Defect Liability Period	18.1 The Supplier warrants that the Goods supplied under the Contract are new, unused, of the most recent or current models and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Supplier further warrants that all Goods supplied under this Contract shall have no defect, arising from design, materials, or workmanship (except when the design and/or material is required by the Procuring Agency, specifications) or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods in the conditions prevailing in Pakistan. 18.2 This warranty shall remain valid for a period specified in the SCC after the Goods, or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the Contract, or for a period specified in the SCC after the date of shipment from the port or place of loading in the source country, +whichever period concludes earlier, unless specified otherwise in SCC. 18.3 The Procuring Agency shall promptly notify the Supplier in writing or in electronic forms that provide record of the content of communication of any claims arising under this warranty. 18.4 Upon receipt of such notice, the Supplier shall, within the period specified in

	SCC and with all reasonable speed, repair or replace the defective Goods or parts thereof, without costs to the Procuring Agency other than, where applicable, the cost of inland delivery of the repaired or replaced Goods or parts from EXW or the port or place of entry to entry to the final destination. 18.5 If the Supplier, having been notified, fails to remedy the defect(s) within the period specified in SCC, the Procuring Agency may proceed to take such remedial action as may be necessary, at the Supplier's risk and expense and without prejudice to any other rights which the Procuring Agency may have against the Supplier under the Contract.
19. Payment	19.1 The method and conditions of payment to be made to the Supplier under this Contract shall be specified in SCC. 19.2 The Supplier's request(s) for payment shall be made to the Procuring Agency in writing to the GM Finance & Accounts and in electronic form to GM Security that provide record of the content of communication, accompanied by an invoice describing, as appropriate, the Goods delivered and Services performed, and by documents submitted pursuant to GCC Clause 13, and upon fulfillment of other obligations stipulated in the Contract. 19.3 Payments shall be made promptly by the Procuring Agency, within thirty (30) days after submission of an invoice or claim by the Supplier. If the Procuring Agency makes a late payment, the Supplier shall be paid interest on the late payment. Interest shall be calculated from the date by which the payment should have been made up to the date when the late payment is made at the rate as specified in the SCC. 19.4 The currency or currencies in which payment is made to the Supplier under this Contract shall be specified in SCC subject to the following general principle: payment will be made in the currency or currencies in which the payment has been requested in the Supplier's Bid. 19.5 All payments shall be made in the currency or currencies specified in the SCC pursuant to GCC Clause 19.4
20. Prices	20.1 The contract price shall be as specified in the Contract Agreement Subject to any additions and adjustments thereto or deductions there from, as may be made pursuant to the Contract. 20.2 Prices charged by the Supplier for Goods delivered and Services performed under the Contract shall not vary from the prices quoted by the Supplier in its Bid, with the exception of any price adjustments authorized in SCC or in the Procuring Agency's request for Bid Validity extension, as the case may be.
21. Change Orders	21.1 The Procuring Agency may at any time, by a written order given to the Supplier pursuant to GCC Clause 22, make changes within the general scope of the Contract in any one or more of the following: a) Drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Procuring Agency; b) The method of shipment or packing; c) The place of delivery; and/or d) The Services to be provided by the Supplier. 21.2 If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract

	an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within thirty (30) days from the date of the Supplier's receipt of the Procuring Agency change order. 21.3 Prices to be charged by the supplier for any related services that might be needed but which were not included in the Contract shall be agreed upon in advance by the Parties and shall not exceed the prevailing rates charged to other parties by the Supplier for similar services
22. Contract Amendments	22.1 Subject to GCC Clause 20 , no variation in or modification of the terms of the Contract shall be made except by written amendment signed by the parties.
23. Assignment	23.1 Neither the Procuring Agency nor the Supplier shall assign, in whole or in part, obligations under this Contract, except with the prior written consent of the other party.
24. Sub-Contracts	24.1 The Supplier shall consult the Procuring Agency in the event of subcontracting under this contract if not already specified in the Bid. Subcontracting shall not alter the Supplier's obligations. 24.2 Subcontracts must comply with the provision of GCC Clause 5.
25. Delays in the Supplier's Performance	25.1 Delivery of the Goods and performance of Services shall be made by the Supplier in accordance with the time schedule prescribed by the Procuring Agency in the Schedule of Requirements. 25.2 If at any time during performance of the Contract, the Supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the Goods and performance of Services, the Supplier shall promptly notify the Procuring Agency in writing or in electronic forms that provide record of the content of communication of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the Supplier's notice, the Procuring Agency shall evaluate the situation and may at its discretion extend the Supplier's time for performance, with or without liquidated damages, in which case the extension shall be ratified by the parties by amendment of Contract. 25.3 Except as provided under GCC Clause 28, a delay by the Supplier in the performance of its delivery obligations shall render the Supplier liable to the imposition of liquidated damages pursuant to GCC Clause 26, unless an extension of time is agreed upon pursuant to GCC Clause 25.2 without the application of liquidated damages.
26. Liquidated Damages	26.1 Subject to GCC Clause 28 , if the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Procuring Agency shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as liquidated damages, a sum equivalent to the percentage specified in SCC of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the performance security (or guarantee) specified in SCC . Once the said maximum is reached, the Procuring Agency may consider termination of the Contract pursuant to GCC Clause 26 .
27. Termination for Default	27.1 The Procuring Agency or the Supplier, without prejudice to any other remedy for breach of Contract, by written notice of default sent to the concerned party may terminate the Contract if the other party causes a fundamental breach of the Contract.

	27.2 Fundamental breaches of Contract shall include, but shall not be limited to the following: a) the Supplier fails to deliver any or all of the Goods within the period(s) specified in the Contract, or within any extension thereof granted by the Procuring Agency pursuant to GCC Clause 24; or b) the Supplier fails to perform any other obligation(s) under the Contract; c) Supplier's failure to submit performance security (or guarantee) within the time stipulated in the SCC; d) the supplier has abandoned or repudiated the contract. e) the Procuring Agency or the Supplier is declared bankrupt or goes into liquidation other than for a reconstruction or amalgamation; f) a payment is not paid by the Procuring Agency to the Supplier after 84 days from the due date for payment; g) the Procuring Agency gives Notice that goods delivered with a defect is a fundamental breach of Contract and the Supplier fails to correct it within a reasonable period of time determined by the Procuring Agency; and h) if the Procuring Agency determines, based on the reasonable evidence, that the Supplier has engaged in corrupt, coercive, collusive, obstructive or fraudulent practices, in competing for or in executing the Contract. 27.3 For the purpose of this clause: "Corrupt and Fraudulent Practice" means the practices as described in Rule-2 (1) (f) of Public Procurement Rules-2004. 27.4 In the event the Procuring Agency terminates the Contract in whole or in part, pursuant to GCC Clause 26.1, the Procuring Agency may procure, upon such terms and in such manner as it deems appropriate, Goods or Services similar to those undelivered, and the Supplier shall be liable to the Procuring Agency for any excess costs for such similar Goods or Services. However, the Supplier shall continue performance of the Contract to the extent not terminated.
28. Termination for Force Majeure	28.1 Notwithstanding the provisions of GCC Clauses 25, 26, and 27, neither Party shall have any liability or be deemed to be in breach of the Contract for any delay nor is other failure in performance of its obligations under the Contract, if such delay or failure is a result of an event of Force Majeure. For purpose of this clause, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and its origin is not due to negligence or lack of care on the part of a Party, and which makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible in the circumstances, and includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood, epidemics, or other adverse weather conditions, strikes, lockouts or other industrial action (except where such strikes, lockouts or other industrial action are within the power of the Party invoking Force Majeure to prevent 28.2 If a Party (hereinafter referred to as "the Affected Party") is or will be prevented from performing its substantial obligation under the contract by Force Majeure, it shall give a Notice to the other Party giving full particulars of

		the event and circumstance of Force Majeure in writing or in electronic forms that provide record of the content of communication of such condition and the cause thereof. Unless otherwise directed by the Procuring Agency in writing or in electronic forms that provide record of the content of communication, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
29. Termination for Insolvency	29.1	The Procuring Agency may at any time terminate the Contract by giving written notice to the Supplier if the Supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the Supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the Procuring Agency.
30. Termination for Convenience	30.1	The Procuring Agency, by written notice sent to the Supplier, may terminate the contract, in whole or in part, at any time for its convenience. The notice of termination shall specify that termination is for the Procuring Agency's convenience, the Contract is terminated, and the date upon which such termination becomes effective.
	30.2	The Goods that are complete and ready for shipment within thirty (30) days after the Supplier's receipt of notice of termination shall be accepted by the Procuring Agency at the Contract terms and price. For the remaining Goods, the Procuring Agency may elect: a) To have any portion completed and delivered at the Contract terms and prices; and / or b) To cancel the remainder and pay to the Supplier an agreed amount for partially completed Goods and Services and for materials and parts previously procured by the Supplier.
31. Disputes Resolutions	31.1	In the event of any dispute arising out of this contract, either party shall issue a notice of dispute to settle the dispute amicably. The parties hereto shall, within twenty-eight (28) days from the notice date, use their best efforts to settle the dispute amicably through mutual consultations and negotiation. Any unsolved dispute may be referred by either party to an arbitrator that shall be appointed by mutual consent of the both parties.
	31.2	After the dispute has been referred to the arbitrator, within 30 days, or within such other period as may be proposed by the Parties, the Arbitrator shall give its decision. The rendered decision shall be binding to the Parties.
32. Procedure for Disputes Resolutions	32.1	The arbitration shall be conducted in accordance with the arbitration procedure published by the Institution named and in the place shown in the SCC .
	32.2	The rate of the Arbitrator's fee and administrative costs of arbitration shall be borne equally by the Parties. The rates and costs shall be in accordance with the rules of the Appointing Authority. In conducting arbitration to its finality each party shall bear its incurred costs and expenses.
	32.3	The arbitration shall be conducted in accordance with the arbitration procedure published by the institution named and in the place shown in the SCC .
33. Replacement of Arbitrator	33.1	Should the Arbitrator resign or die, or should the Procuring Agency and the Supplier agree that the Arbitrator is not functioning in accordance with the provisions of the contract, a new Arbitrator shall be appointed by mutual consent of the both parties.

34. Limitation of Liability	34.1 Except in cases of criminal negligence or willful conduct, and in the case of infringement pursuant to GCC Clause 8, a) The supplier shall not be liable to the Procuring Agency, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the Supplier to pay liquidated damages to the Procuring Agency; and b) The aggregate liability of the Supplier to the Procuring Agency, whether under the Contract, in tort or otherwise, shall not exceed the total Contract Price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment or to any obligation of the Supplier to indemnify the Procuring Agency with respect to patent infringement.
35. Notices	35.1 Any notice given by one party to the other pursuant to this Contract shall be sent to the other party in writing or in electronic forms that provide record of the content of communication and confirmed in writing or in electronic forms that provide record of the content of communication to the other party's address specified in SCC. 35.2 A notice shall be effective when delivered or on the notice's effective date, whichever is later.
36. Taxes and Duties	36.1 A foreign Supplier shall be entirely responsible for all taxes, stamp duties, license fees, and other such levies imposed outside Pakistan. 36.2 If any tax exemptions, reductions, allowances or privileges may be available to the Supplier in Pakistan the Procuring Agency shall use its best efforts to enable the Supplier to benefit from any such tax savings to the maximum allowable extent. 36.3 A local Supplier shall be entirely responsible for all taxes, duties, license fees, etc., incurred until delivery of the contracted Goods to the Procuring Agency.

SECTION VIII: SPECIAL CONDITIONS OF THE CONTRACT (SCC)

Special Conditions of Contract (SCC)

The following Special Conditions of Contract (SCC) shall supplement the GCC. Whenever there is a conflict, the provisions herein shall prevail over those in the GCC. The corresponding clause number of the GCC is indicated in parentheses.

SCC Clause Number	GCC Clause Number	Amendments of, and Supplements to, Clauses in the GCC
		Definitions (GCC 1)
1.	1.1	The Procuring Agency is: <i>[Subject]</i>
2.	1.1(p)	The Supplier is: <i>[Name and address]</i>
3.	1.1(q)	The title of the subject procurement or The Project is: Hiring of Services for construction of PSPC Main Gate (N1) along with reception building; allied road works, civil works, MEP works and Supply & Installation of Security Equipment
		Governing Language (GCC 4)
4.	4.1	The Governing Language shall be: English
		Applicable Law (GCC 5)
5.	5.1	The Applicable Law shall be: Laws of Pakistan
		Country of Origin (GCC 6)
6.	6.1	Country of Origin is the country where offered items is/are manufactured.
		Performance Security (or guarantee) (GCC 10)
7.	10.1	The amount of performance guarantee, as a percentage of the Contract Price, shall be: <i>[05% (five percent)]</i>
8.	10.4	Successful bidder, shall submit 5% performance guarantee and the same guarantee must be valid for a period exceeding 28 days after completion of contract.
		Inspections and Tests (GCC 11)
9.	11.1	Inspection and tests prior to shipment of Goods and at final acceptance are as follows; As specified in technical specification / BOQ. (Not applicable)
		Packing (GCC Clause 12)

10.	12.2	The following SCC shall supplement GCC Clause 12.2: The packing shall be sea / air worthy and of international export packing standards and shall be adequately protected from damages and pilferage during shipment and transportation to site and it shall be the Bidder's responsibility to provide undamaged material in the quantities required under the Contract. All costs associated with packing protection must be included in the Bidding document.
Delivery and Documents (GCC Clause 13)		
11.	13.1	For Goods supplied from abroad: Not Applicable

12.	13.3	For Goods from within Pakistan: Upon delivery of the Goods to the transporter, the Supplier shall notify the Procuring Agency and mail the following documents to the Procuring Agency: (i.) one original plus four copies of the Supplier's invoice showing Goods' description, quantity, unit price, and total amount; (ii.) delivery note, railway receipt, or truck receipt; (iii.) Manufacturer's or Supplier's warranty certificate as specified in BOQ / Technical specification; (iv.) inspection certificate issued by the nominated inspection agency, and the Supplier's factory inspection report (if desired in BOQ); and (v.) certificate of country of origin issued by Pakistan Chamber of Commerce and Industry or equivalent authority in the country of origin in duplicate (if desired in BOQ). The above documents shall be received by the Procuring Agency before arrival of the Goods and, if not received, the Supplier will be responsible for
		Insurance (GCC Clause 14)
13.	14.1	Not applicable.
		Related Services (GCC Clause 16)
14.	16.1	Related services to be provided are: Supplier shall provide all the related services as per GCC-16 without any additional cost to the Procuring Agency (If required in BOQ / Technical specification).
		Spare Parts (GCC Clause 17)
15.	17.1	Additional spare parts requirements are: Supplier shall carry sufficient inventories to assure ex-stock supply of consumable spares for the Goods. Other spare parts and components shall be supplied as promptly as possible, but in any case, within six (6) months of placing the order (If required in BOQ / Technical specification). (Not applicable)

	Warranty (GCC Clause 18)	
16.	18.2	GCC Clause 18.2—In partial modification of the provisions, the The Supplier shall, in addition, comply with the performance and/or consumption guarantees specified under the Contract. If, for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the Supplier shall, at its discretion, either: a. make such changes, modifications, and/or additions to the Goods or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests in accordance with SCC 4. b. pay liquidated damages to the Procuring Agency with respect to the failure to meet the contractual guarantees. The rate of these liquidated damages shall be 02 percent per month of undelivered materials/goods/works value up to the sum equivalent to the amount of ten percent of the contract value. c. The Supplier shall provide warranty as specified in BOQ/Technical Specification.
17.	18.4 & 18.5	The period for correction of defects in the warranty period is: As specified in BOQ/Technical Specification.
	Payment (GCC Clause 19)	
18.	19.1	For Supply a) 80% payment of supplies will be released after delivery and inspection of equipment's. b) 20% balance will be released after successful installation, testing, commissioning, and training. For Services a) 100% payment will be released after successful installation, testing, commissioning, and training.
19.	19.3	Rate to be used for paying the Supplier's interest on the late payment made by Procuring Agency shall be (Not Applicable)
	Prices (GCC Clause 20)	
20.	20.1	Quoted Prices shall not be adjusted.
	Liquidated Damages (GCC Clause 26)	
21.	25.1	The SUPPLIER shall pay to the BUYER at the rate of 2% per month or part of month for the value of the stores which the SUPPLIER has failed to deliver within the stipulated period, provided that damages shall not exceed 10% of the total price payable under the Purchase Contract, otherwise BUYER will make deduction from

		SUPPLIER'S bill. After which the purchaser may consider termination of the contract pursuant to GCC 24.
	Procedure for Dispute Resolution (GCC Clause 32)	
23.	32.3	Dispute Resolution In case of any dispute and difference which may arise in connection with the execution of the contract, the matter shall be referred to Managing Director of Corporation, who shall take decision in the matter. In case the dispute remains unresolved, the matter will be resolved through arbitration as per the Arbitration Act, 1940.
	Notices (GCC Clause 35)	
26.	35.1	— Procuring Agency's address for notice purposes: <i>(to be inserted at the time of contract signing)</i> — Supplier's address for notice purposes: <i>(to be inserted at the time of contract signing)</i>
	Tax & Duties (GCC Clause 36)	
27	36	Prices payable to the Supplier as stated in the Contract are not subject to any adjustment during performance of the contract. However, any subsequent legislation enacted, changes in the rate of any tax, levy of additional tax or duty during the currency of contract that impacts the contract price would be duly accounted for by both the parties of the contract i.e. in case of increase or decrease in the rates of the said taxes and duties or levy of any new tax or duty, the contract price would be adjusted accordingly.
	Confidentiality	

28		28.1 Information relating to evaluation of bids and recommendations concerning to award of the Contract shall not be disclosed by the Procuring Agency to the Supplier or to any other person who is not officially concerned with the process, until the announcement of the result of evaluation. 28.2 The Supplier shall not disclose or attempt to make public any information relating to the bidding documents, bidding process and award of the Contract to any person or entity without the Procuring Agency's prior written consent. 28.3 In case of any disclosure related to the bidding process and contractual obligations at any stage by the Supplier, the Procuring Agency may terminate the Contract.

SECTION IX: CONTRACT FORMS

(TO BE EXECUTED ON N.J. STAMP PAPER VALUING 0.35% OF PURCHASE ORDER)

PURCHASE CONTRACT

PURCHASE ORDER # _____

This agreement made on the ____ day of _____ effective from ____ between Messrs, _____, hereinafter referred to as SUPPLIER & Pakistan Security Printing Corporation (Pvt) Limited, Karachi, Pakistan, hereinafter referred as BUYER on the following terms as conditions: -

1. COMMODITY	:	_____
2. SPECIFICATIONS	:	_____
3. COUNTRY OF ORIGIN	:	_____
4. QUANTITY	:	_____
5. UNIT PRICE	:	_____
6. TOTAL VALUE	:	_____
7. PACKING	:	_____
8. TERMS OF PURCHASE	:	Free delivery at BUYER Factory situated at Jinnah Avenue, Malir Halt, Karachi

9. DELIVERY:

The SUPPLIER shall deliver the goods within as per Purchase order from the date of Purchase Order, to the authorized representative of the Corporation and obtain his signature with name and designation, otherwise the BUYER will not be responsible for the goods delivered. No supply shall be made on holidays & after 4 pm from Monday to Thursday & 1 pm on Friday & Saturday.

10. LIQUIDATED DAMAGES:

The SUPPLIER shall pay to the BUYER at the rate of 2% per month or part of month for the value of the stores which the SUPPLIER has failed to deliver within the stipulated period, provided that damages shall not exceed 10% of the total price payable under the Purchase Contract, otherwise BUYER will make deduction from SUPPLIER'S bill.

11. FORCE MAJEURE

The SUPPLIER shall not be held responsible for late or non-delivery of the goods due to strikes and generally recognized force majeure causes. However, in such cases, the SUPPLIER shall deliver to the BUYER a certificate of the accident issued by the competent Government Authority and/or the Chamber of Commerce at the place where the accident occurred as evidence thereof, reasonable extension shall be granted at the option of the Corporation.

12. INSPECTION

The BUYER or his authorized representative shall have the right to inspect any goods after or before the dispatch from the SUPPLIER'S Factory or premises. However, such inspection shall not absolve the SUPPLIER from the responsibility or liability for the delivery of goods according to the contracted specification nor shall be interpreted so as in any way to imply acceptance of such goods.

13. WARRANTY

The SUPPLIER hereby gives a warranty that the supplies to be made by him will be highest grade in quality consistent with the established and generally accepted standards. The SUPPLIER Shall protect and indemnify the BUYER against loss, damages and expenses whatever that the BUYER may suffer as a result of failure of the material to render useful service and that this warranty to remain effective after

inspection and payment, as to the patent or latent defect detected after installation or use for a period of _____.

14. CLAIM.

If the SUPPLIER fails to deliver the goods within the period stipulated in the contract, or if the goods are short in weight, or if the packing of the goods is not in conformity with the contracted specification or reference samples, or if the goods otherwise not in accordance with the contracted specifications, the BUYER shall have the right in addition to and notwithstanding their right to claim compensation for breach of contract, to terminate the un-executed part of the contract and make purchases from other sources at the risk and cost of the SUPPLIER. The supplier shall settle all claims referred by the BUYER within fifteen days of the receipt of the same and in the event of their failure to do so, shall be liable to pay interest @ 14% per annum of the amount claimed

15. PERFORMANCE GUARANTEE.

05% Performance Guarantee is required of the total contract amount for the entire contract period and would be kept with PSPC for a period of 2 years after project completion. The Performance Guarantee shall be in the form of Payment order / Demand Draft or an unconditional Bank Guarantee or insurance guarantee (*PACRA Rating AAA & AA+ only*) enforceable in Pakistan as per Performance Guarantee form specified in the Bidding Documents.

In case of successful bidder, bid security will be treated as performance guarantee.

16. OTHER CONDITIONS:

- A) The SUPPLIER shall arrange delivery of goods with advance Note or Delivery Challan on which the Purchase Order No. quantity and suppliers name must be mentioned. Otherwise it shall be liable to non-acceptance and held by the BUYER at the SUPPLIER risk and if not cleared by them within a week time, go down expenses shall be charged at actual.
- B) The SUPPLIER shall not transfer or assign directly to any person or person any portion of this contract without prior written consent of the Buyer.

17. PAYMENT.

Part supply / Services Part Payment may be allowed as per BOQ. Payment shall be made by the BUYER through cheque within 30 days of receipt of two copies of the invoice/ bill by the G.M (F&A) P.S.P.C and one copy by the Purchase Order Manager P.S.P.C. along with copy of relevant advice note or challan and acceptance certificate from the BUYER authorized Officer/ Stock Controller.

18. TAXES & CHARGES.

Supplier shall pay all taxes & charges with respect to transaction of business under this contract agreement liable under any law enforce for the time being which may subsequently enforce during the execution of this agreement.

19. ARBITRATION

In case of any dispute and difference which may arise in connection with the execution of the contract, the matter shall be referred to Managing Director of Corporation, who shall take decision in the matter.

In case the dispute remains unresolved, the matter will be resolved through arbitration as per the Arbitration Act, 1940.

20. TERMINATION

The purchaser, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate this contract in whole or in part:

A- If the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, or within any extension thereof.

B- If the supplier fails to perform any other obligations(s) under the contract.

C- If the supplier, in the judgment of purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the contract. In the event the purchaser terminates the contract in whole or in part, the purchaser may procure, upon such terms and in such manner as it deems appropriate, goods & services similar to those undelivered, and the supplier shall be liable to the purchaser for any excess costs for such similar goods or services. However, the supplier shall continue performance of the contract to the extent not terminated.

For and on behalf of CORPORATION

For and on behalf of the CONTRACTOR

Signature.: _____	Signature. _____
Name. _____ PAKISTAN SECURITY PRINTING CORPORATION (Pvt) LTD. Jinnah Avenue, Malir Halt, Karachi.	Name. _____ _____ _____ _____
W I T N E S S E S: -	
Signature : _____	Signature : _____
Name : _____	Name : _____
Address : _____ _____ _____	Address : _____ _____ _____
N.I.C. NO. : _____	N.I.C. NO. : _____

Integrity Pact

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 Number: _____

Contract Value: _____

Contract Title _____

Date: _____

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

Without limiting the generality of the foregoing [Name of Supplier] represents and warrants that it has fully declared the brokerage, commission, fee 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 consultations fee or otherwise, with the object of obtaining or inducing the procurement of a contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP, except that which has been expressly declared pursuant hereto.

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

[Name of Supplier] accepts full responsibility and strict liability for making and false declaration, not making full disclosure, misrepresenting fact 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 right and remedies available to GoP under any law, contract or other instrument, be voidable at the option of GoP.

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

commission, gratification, bribe, finder's fee or kickback given by [Name of Supplier] as aforesaid for the purpose of obtaining or inducing the procurement of any contract, right, interest, privilege or other obligation or benefit in whatsoever form from GoP.

[Buyer]

[Seller/Supplier]

Performance Security (or guarantee) Form

To: [Subject]

WHEREAS *[name of Supplier]* (hereinafter called “the Supplier”) has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* to delivery *[description of goods and services]* (hereinafter called “the Contract”).

AND WHEREAS it has been stipulated by you in the said Contract that the Supplier shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Supplier’s performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Supplier a guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Supplier, up to a total of *[amount of the guarantee in words and figures]*, and we undertake to pay you, upon your first written demand declaring the Supplier to be in default under the Contract and without cavil or argument, any sum or sums within the limits of *[amount of guarantee]* as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

This guarantee is valid until the: *[insert date]*

Signature and seal of the Guarantors

[name of bank or financial institution]

[address]

[date]