

# Volume-1

**" REHABILITATION OF COMMON AND  
WASHROOM AREAS ALONG WITH SUPPLYING,  
INSTALLATION, TESTING AND COMMISSIONING  
OF LIFT ALONGWITH CIVIL/MECHANICAL  
STRUCTURE AND MISCELLANEOUS WORKS AT  
SLB, MULTAN"**

**(CIVIL WORKS)**

**(Single Stage-Two Envelop Procedure)**



**1<sup>ST</sup> FLOOR REAL ESTATE DEPARTMENT  
STATE LIFE BUILDING #11 DAVIS ROAD  
LAHORE.**

# Standard Bidding Documents

## for

# Procurement of Works

### **PART-A – BIDDING PROCEDURE & REQUIREMENTS**

#### **Section I - Invitation for Bids**

#### **Section II- Instructions to Bidders (ITB)**

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

#### **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 – Evaluation and Qualification Criteria**

This section contains information regarding evaluation and qualification criteria including domestic preference.

#### **Section VI– Works Requirements, Technical Specifications, Drawings, Supplementary Information and Bill of Quantities**

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

#### **Section VII– Standard Bidding 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 its Bid.

### **PART-B – CONDITIONS OF CONTRACT AND CONTRACT FORMS**

#### **Section VIII - General Conditions of Contract (GCC)**

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

#### **Section IX - Special Conditions of Contract (SCC)**

This Section consists of Contract Data and Specific Provisions which contains clauses specific to this contract.

**Section X - Contract Forms**

This Section contains forms which, once completed, will become part of the Contract including Letter of Acceptance, Contract Agreement, Integrity Pact and other relevant forms. The forms for **Performance Security/ Guarantee and Beneficial Owners Information** will be provided by the successful bidder to whom Letter of Acceptance is issued, before the award of contract.

**PART-A**  
**BIDDING PROCEDURE & REQUIREMENTS**

**SECTION I: INVITATION FOR BIDS**

## ***Invitation to Bid***

Tender No.: **LOT-A: RED-LHR-LIFT-SLB-MULTAN-09-2026**  
**LOT-B: RED-LHR-CIVIL-SLB-MULTAN-09-2026**

1. **"REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN"** with a time limit of 180 days
2. STATE LIFE INSURANCE CORPORATION OF PAKISTAN, a public sector organization invites bids through e-Pak Acquisition & Disposal System (EPADS) <https://eprocure.gov.pk> from the ***reputed firms/Contractors*** registered with Pakistan Engineering Council in category C-5 WITH specialization codes CE-01 & ME-03 or above renewed for the year 2026-27 having expertise in Building work and registered with Income tax, GST and Punjab Revenue Authority and who are also on Active Tax Payers List (ATL) of FBR for the work titled **"REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN"**.
3. The procedure of open competitive bidding is **Single Stage-Two Envelope**.
4. The complete Tendering process will be carried out through e-Pak Acquisition & Disposal System (EPADS) <https://eprocure.gov.pk>.
5. Interested bidders are requested to register themselves on the e-Pak Acquisition & Disposal System (EPADS) <https://eprocure.gov.pk/#/supplier/registration> and submit their tender documents through the EPADS.
6. The Bid Security for the Lot-A is **Rs. 640,000/-** and Lot-B is **Rs. 375,000/-** in the form of Call Deposit/Bank Draft (refundable) drawn in favor of "STATE LIFE INSURANCE CORPORATION OF PAKISTAN"; scanned copy of which is required to be uploaded through EPADS and hard copy of Call Deposit/ Bank Draft(Original) must be submitted physically on the address given above before Closing Date of tender.
7. The tender documents must be submitted via **EPADS** latest by **30-06-2026 till 11:00 am**. Bids will be opened at 11:30 am on the same day, in the presence of bidders / bidder's representatives who choose to attend at the same address. This advertisement is also available on the PPRA and SLIC website at [www.ppra.org.pk](http://www.ppra.org.pk), [www.statelife.com.pk](http://www.statelife.com.pk) and Newspaper.

**MANAGER/I/C REAL ESTATE**  
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**15-A Davis Road, Lahore**  
**Ph # 99200396, 99203443**

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## SECTION II: INSTRUCTION TO BIDDERS (ITBs)

*[This Section contains provisions that are to be used without modifications.]*

### A. INTRODUCTION

<b>1. Scope of Bid</b>	1.1	The Work under this contract comprises of the “REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN.”
<b>2. Source of Funds</b>	2.1	STATELIFE INSURANCE CORPORATION OF PAKISTAN arranged fund from its own source.
<b>3. Eligible Bidders</b>	3.1	<p>Bidding is open to all firms and persons meeting the following requirements:</p> <p style="margin-left: 40px;">a) Duly licensed by the Pakistan Engineering C-5 WITH CE-01 &amp; ME-03 in the appropriate category for value of Works.</p> <p>A bidder may be natural person, company or firm or public or semi-public agency of Pakistan or any foreign country, or any combination of them with a formal existing agreement (on Judicial Papers) in the form of a joint venture or consortium. In the case of a joint venture or consortium, 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 or consortium 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 or consortium during the Bidding process, and in case of award of contract, during the execution of contract.</p>
	3.2	The appointment of Lead Member in the joint venture or consortium shall be confirmed by submission of a valid

		Power of Attorney to the Procuring agency/Employer
	3.3	Verifiable copy of the agreement that forms a joint venture or consortium shall be required to be submitted as part of the Bid.
	3.4	Any bid submitted by the joint venture or consortium 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/Employer and in line with any instructions issued by the Authority.
	3.5	The invitation for bids is open to all prospective bidders subject to any provisions of incorporation or licensing by the respective national/ international 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 bidding 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/Employer along with their bid, however, the final award will be subject to the complete registration process.
	3.7	<p>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:</p> <ul style="list-style-type: none"> <li>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/Employer to provide consulting services for the preparation of design or technical specifications of the works that are the subject of the bid; or</li> <li>b) any of its affiliates has been hired (or is proposed to be hired) by the Procuring agency/Employer as Engineer for the Contract implementation; or</li> <li>c) The works to be executed are resulting from or directly related to consulting services for the preparation or implementation of the project that the bidder provided</li> </ul>

		<p>or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm;</p> <p>d) have controlling shareholders in common; or</p> <p>e) receive or have received any direct or indirect subsidy from any of them; or</p> <p>f) have the same legal representative for purposes of this Bid; or</p> <p>g) 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/Employer regarding this Bidding process; or</p> <p>h) Submit more than one bid in this bidding process.</p>
	3.8	<p>A Bidder may be ineligible if –</p> <p>(a) he is declared bankrupt or, in the case of company or firm, insolvent;</p> <p>(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;</p> <p>(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;</p> <p>(d) the bidder is convicted, by a final judgment of a Court of Law or relevant Professional Statutory Body, of any offence involving professional conduct;</p> <p>(e) The bidder is debarred/ blacklisted by a national level Procuring agency/Employer and hence debarred due to involvement in corrupt and fraudulent practices, or performance failure or due to breach of bid securing declaration.</p> <p>(f) The bidder is blacklisted or debarred by a foreign country, international organization, or other foreign institutions for the period defined by them.</p>
	3.9	<p>Bidders shall provide to the Procuring agency/Employer evidence of their eligibility, proof of compliance with the necessary legal requirements to carry out the contract</p>

		effectively.
	3.10	Bidders shall provide such evidence of their continued eligibility to the satisfaction of the Procuring agency/Employer, as the Procuring agency/Employer shall reasonably request.
	3.11	Bidders shall submit proposal relating to the nature, conditions and modalities of sub-contracting wherever the sub-contracting of any elements of the contract is envisaged.
<b>4. Eligible Material and Equipment</b>	4.1	All the material and equipment to be mobilized under the contract shall have their origin in eligible source countries, and all expenditures made under the contract will be limited to such materials and equipment. For this purpose, ineligible countries are stated in the section-IV titled as “Eligible Countries”.
	4.2	For purposes of this Clause, “origin” means the place where the material, equipment is 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 services are/to be supplied.
	4.3	The nationality of the bidder shall not determine the origin of the material and equipment.
	4.4	To establish the eligibility of the material and equipment, Bidders shall fill the country-of-origin declarations included in the Form of Bid.
<b>5. One Bid per Bidder</b>	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.
<b>6. Cost of Bidding</b>	6.1	The Bidder shall bear all costs associated with the preparation and submission of its bid, and the Procuring agency/Employer shall in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

## B. BIDDING DOCUMENTS

<p><b>7. Contents of Bidding Documents</b></p>	<p>7.1</p>	<p>The scope of Works, bidding procedures, and terms and conditions of the contract are prescribed in the bidding documents. In addition to the Invitation for Bids, the bidding documents which should be read in conjunction with any addenda issued in accordance with <b>ITB 9.2</b> include:</p> <p><b>Section I</b> -Invitation for Bids  <b>Section II</b> Instructions to Bidders (ITBs)  <b>Section III</b> Bid Data Sheet (BDS)  <b>Section IV</b> Eligible Countries  <b>Section V</b> Works Requirements Technical Specifications &amp; Schedule of Requirements  <b>Section VI</b> Standard Bidding Forms  <b>Section VII</b> General Conditions of Contract (GCC)  <b>Section VIII</b> Special Conditions of Contract (SCC)  <b>Section IX</b> Contract Forms</p>
	<p>7.2</p>	<p>The number of copies to be completed and submitted with the Bid is specified in the <b>BDS</b>.</p>
	<p>7.3</p>	<p>The Procuring agency/Employer is not responsible for the completeness of the bidding documents and their addenda, if they were not obtained directly from the Procuring agency/Employer or the signed pdf version downloaded from the website of the Procuring agency/Employer or the Authority’s website or e-Procurement System as the case may be. However, Procuring agency/Employer shall place both the pdf and editable version of the same on its website and Authority’s website or e-Procurement System to facilitate the bidder for filling the standard bidding forms.</p>
	<p>7.4</p>	<p>The bidder is expected to examine all instructions, forms, specifications, terms and conditions prescribed 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.</p>
<p><b>8. Clarification of Bidding Document, Pre-bid Meeting</b></p>	<p>8.1</p>	<p>A prospective bidder requiring any clarification of the bidding document may notify the Procuring agency/Employer in writing or in electronic form that provides record of the contents of communication at the Procuring agency/Employer's address indicated in the <b>BDS</b>.</p>
	<p>8.2</p>	<p>The Procuring agency/Employer 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)</p>

		days prior to the deadline for the submission of Bids as prescribed in <b>ITB 24.1</b> . However, this clause shall not apply in case of alternate methods of procurement.
	8.3	<p>Copies of the Procuring agency/Employer's response will be forwarded to all identified prospective bidders through an identified source of communication, including a description of the inquiry, but without specifying its source.</p> <p>In case of downloading of the bidding documents from the website of Procuring agency/Employer or e-Procurement System, the response of all such queries will also be available on the same platform available at the website.</p>
	8.4	Should the Procuring agency/Employer deem it necessary to amend the bidding documents as a result of a clarification, it shall do so following the procedure as prescribed under <b>ITB 09</b> .
	8.5	If indicated <b>in the BDS</b> , 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 <b>BDS</b> . 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/Employer exclusively through the use of an Addendum pursuant to <b>ITB 9</b> . Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.
	8.7	The bidder is advised to visit and examine the Site of Works and its surroundings and obtain for itself on its own responsibility all information that may be necessary for preparing the bid and entering into a contract for construction of the Works. The costs of visiting the Site shall be at the bidder's own expense.
	8.8	The bidder and any of its authorized personnel will be granted permission by the Procuring agency/Employer to enter upon its premises and lands for the purpose of such visit, but only upon the express condition that the bidder and its personnel will release and indemnify the Procuring agency/Employer from and against all liability in respect thereof, and will be

		responsible for death or personal injury, loss of or damage to property, and any other loss, damage, costs, and expenses incurred as a result of the inspection.
<b>9. Amendment of Bidding Documents</b>	9.1	Before the deadline for submission of bids, the Procuring agency/Employer 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 <b>ITB 7.1</b> and shall be communicated in a timely manner and on equal opportunity basis. Where notification of such change, addition, modification or deletion becomes essential, such notification shall be made in a manner similar to the original advertisement.  <i>Provided that the bidder who had either already submitted their bid or handed over the bid to the courier prior to the issuance of any such addendum shall have the right to withdraw his already filed bid and submit the revised bid prior to the original or extended bid submission deadline.</i>
	9.3	To give prospective bidders reasonable time in which to take an addendum/corrigendum into account in preparing their bids, the Procuring agency/Employer may, at its discretion, extend the deadline for the submission of bids:  <i>Provided that the Procuring agency/Employer shall extend the deadline for submission of bid, if such an addendum is issued within last three (03) days of the bid submission deadline.</i>

### C. PREPARATION OF BIDS

<b>10. Language of Bid</b>	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/Employer shall be written in the English language unless specified in the <b>BDS</b> . 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 <b>BDS</b> , in which case, for purposes of interpretation of the bidder, the translation shall govern.
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<p><b>11. Documents Establishing Eligibility of Material, Equipment and Works, their Conformity to Bidding Documents</b></p>	<p>11.1</p>	<p>The bid prepared by the bidder shall constitute the following components: -</p> <ul style="list-style-type: none"> <li>a) Documentary evidence established in accordance with <b>ITB 11</b> that the material, equipment and services to be provided by the Bidder are eligible material, equipment and services, and conform to the Bidding Documents;</li> <li>b) Documentary evidence established in accordance with <b>ITB 12</b> that the bidder has been authorized to carry out the Construction works;</li> <li>c) Documentary evidence established in accordance with <b>ITB 12</b> that the bidder is eligible and/or qualified for the subject bidding process;</li> <li>d) Form of Bid and Bid Prices completed in accordance with <b>ITB 14 and 15</b>;</li> <li>e) Completed schedules as required, including priced Bill of Quantities in accordance with <b>ITB 13 &amp; 15</b>.</li> <li>f) Technical Proposal completed in all aspects in accordance with <b>ITB-17</b>.</li> <li>g) Bid security or Bid Securing Declaration furnished in accordance with <b>ITB 19</b>;</li> <li>h) Alternative bids, if permissible, in accordance with <b>ITB 20</b>;</li> <li>i) Duly Notarized Power of Attorney authorizing the signatory of the Bidder to submit the bid; and</li> <li>j) Any other document required in the <b>BDS</b>.</li> </ul>
	<p>11.2</p>	<p>In addition to the requirements, bids submitted by a JV shall include a copy of the Joint Venture Agreement entered into by all members. Alternatively, a letter of intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all members and submitted with the bid, together with a copy of the proposed Agreement.</p>
	<p>11.3</p>	<p>The bidder shall furnish, as part of its bid, all those documents establishing the eligibility in conformity to the terms and conditions specified in the bidding documents for all material, equipment and works which the bidder proposes to execute.</p>
	<p>11.4</p>	<p>The documentary evidence of conformity of the material, equipment and works to the Bidding Documents may be in the form of literature, drawings, and data, and shall consist of:</p> <ul style="list-style-type: none"> <li>a) a detailed description of the work methodology, approach, schedule and resources to be mobilized at site;</li> <li>b) an item-by-item commentary on the Procuring agency/Employer’s Technical Specifications demonstrating substantial responsiveness of the material, equipment and works to those specifications, or a</li> </ul>

		<p>statement of deviations and exceptions to the provisions of the Technical Specifications;</p> <p>c) any other procurement specific documentation requirement as stated in the <b>BDS</b>.</p>
	11.5	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.
<b>12. Documents Establishing Eligibility and Qualification of the Bidder</b>	12.1	The bidder shall furnish, as part of its bid, all those documents establishing the bidder’s eligibility to participate in the bidding process and/or its qualification to perform the contract if its bid is accepted.
	12.2	The documentary evidence of the bidder’s eligibility to bid shall establish to the satisfaction of the Procuring agency/Employer that the bidder, at the time of submission of its bid, is from an eligible country as defined in Section-IV titled as “Eligible Countries”.
	12.3	<p>The documentary evidence of the bidder’s qualification to perform the contract if its bid is accepted shall establish to the satisfaction of Procuring agency/Employer that:</p> <p>a) The bidder has the financial and technical capability necessary to perform the Contract, meets the qualification criteria specified in Section-V, Evaluation and Qualification Criteria and <b>BDS</b>.</p> <p>b) In the case of a bidder not doing business within Pakistan, the bidder is or will be (if awarded the contract) represented by a local bidder (Joint Venture) in accordance with the PEC works bylaws, and in case of award of works such foreign firm is required to participate in the execution of works to carry out its obligations as prescribed in the Conditions of Contract and /or Technical Specifications.</p> <p>c) That the bidder meets the qualification criteria listed in Section-V, Evaluation and Qualification Criteria and <b>BDS</b>.</p>
<b>13. Letter of Bid and Schedules</b>	13.1	The Letter of Bid (Technical or Financial as the case may be) and Schedules, including the Bill of Quantities, shall be prepared using the relevant forms furnished in Standard Bid Forms. The forms must be completed without any alterations to the text, and no substitutes shall be accepted except as provided under <b>ITB 22</b> . All blank spaces shall be filled in with the information requested.
<b>14. Letter of Bid</b>	14.1	The bidder shall fill the Letter of Bid (Technical or Financial as the case may be) furnished in the bidding documents. The Standard Bid Forms must be completed without any alterations

		to its format and no substitute shall be accepted.
<b>15. Bid Prices</b>	15.1	The bid prices quoted by the bidder in the Standard bid Forms, Bill of Quantities and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the bidding documents.
	15.2	The bidder shall fill in rates and prices for all items of the Works described in the Bill of Quantities. If a Price Schedule shows items listed but not priced, their prices shall be construed to be included in the prices of other items in the Bill of Quantities and will not be paid for separately by the Procuring agency/Employer.
	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/Employer 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 <b>ITB 15.1</b> shall be the total price of the bid.
	15.5	Unless otherwise specified in the <b>BDS</b> and the Contract, the rates and prices quoted by the bidder are subject to adjustment during the performance of the Contract in accordance with the provisions of the Conditions of Contract.
	15.6	If so specified in <b>ITB 1.1</b> , bids may be invited for individual lots (contracts) or for any combination of lots (packages).
	15.7	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 <b>ITB 30</b> , unless otherwise price adjustment is permissible under Conditions of the Contract.
	15.8	All duties, taxes, and other levies payable by the Contractor under the Contract, or for any other cause, as of the date twenty-eight (28) days prior to the deadline for submission of bids, shall be included in the rates and prices and the total bid

		price submitted by the bidder.
<b>16. Currencies of Bid and Payment</b>	16.1	The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer’s country shall bear all costs and risks for arranging the requirement of such currencies through his own resources. The currency of payment is Pak Rupees only.
	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, if prescribed in the BDS.
	16.4	Bidders may be required by the Procuring agency/Employer to clarify their foreign currency requirements, if prescribed in the BDS and to substantiate that the amounts included in Lump Sum and in the <b>SCC</b> are reasonable and responsive to <b>ITB 16.1</b> .
<b>17. Documents Comprising the Technical Proposal</b>	17.1	The bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in <b>Section IV – Standard Bid Forms</b> , in sufficient detail to demonstrate the adequacy of the bidder’s proposal to meet the work requirements and the completion time.
<b>18. Bid Validity Period</b>	18.1	Period for bid validity is 120 days after the date of bid opening.
	18.2	Under exceptional circumstances, prior to the expiration of the initial bid validity period, the Procuring agency/Employer 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 <b>ITB 19</b> shall also be extended 28 days beyond the deadline of extended bid validity period. A bidder may refuse the request for the extension of his bid without forfeiting his bid security or causing to be executed his 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 <b>ITB 19</b> in all respects.
<b>19. Bid Security or</b>	19.1	

<b>Bid Securing Declaration</b>		<p>The Bid Security for the Lot-A is <b>Rs. 640,000/-</b> and Lot-B is <b>Rs. 375,000/-</b> in the form of Call Deposit/Bank Draft (refundable) drawn in favor of “STATE LIFE INSURANCE CORPORATION OF PAKISTAN”;</p> <p>In case Procuring agency/Employer is inviting bids in lots / packages, the bidder shall be required to submit his bid security against the respective lot/ package for which he is submitting his bid, which shall not exceed five percent of the estimated value of that particular lot/ package.</p>
	19.2	<p>The Bid Security or Bid Securing Declaration is required to protect the Procuring agency/Employer against the risk of Bidder’s conduct before award of the contract to the most advantageous bidder which would warrant the security’s forfeiture, pursuant to <b>ITB 19.9</b>.</p>
	19.3	<p>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 <b>BDS</b> which shall be in any of the following:</p> <ul style="list-style-type: none"> <li>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/Employer 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;</li> <li>b) A cashier’s or certified cheque; or</li> <li>c) Another security as indicated in the <b>BDS</b>.</li> </ul>
	19.4	<p>The Bid Security or Bid Securing Declaration shall be in accordance with the Form of the Bid Security or Bid Securing Declaration included in <b>Section VI (Standard Bidding Forms)</b> or another form approved by the Procuring agency/Employer prior to the bid submission.</p>
	19.5	<p>The Bid Security shall be payable promptly upon written demand by the Procuring agency/Employer in case any of the conditions listed in <b>ITB 19.9</b> are invoked.</p>
	19.6	<p>Any bid not accompanied by a Bid Security or Bid Securing Declaration in accordance with <b>ITB 19.1 or 19.3</b> shall be rejected by the Procuring agency/Employer and shall be declared as non-responsive bid, pursuant to <b>ITB 30</b>.</p>
	19.7	<p>Unsuccessful bidders’ Bid Security will be discharged or returned as promptly as possible, however in no case later than</p>

		<p>thirty (30) days after the expiration of the period of Bid Validity prescribed by the Procuring agency/Employer pursuant to <b>ITB 18</b>. The Procuring agency/Employer 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:</p> <ul style="list-style-type: none"> <li>(a) The expiry of the Bid Security;</li> <li>(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;</li> <li>(c) The rejection by the Procuring agency/Employer of all Bids;</li> <li>(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.</li> </ul>
	19.8	The successful bidder's Bid Security will be discharged upon the bidder signing the contract pursuant to <b>ITB 47</b> , or furnishing the performance security (or guarantee), pursuant to <b>ITB 48</b> .
	19.9	<p>The Bid Security may be forfeited or the Bid Securing Declaration executed:</p> <ul style="list-style-type: none"> <li>a) if a Bidder: <ul style="list-style-type: none"> <li>i) Withdraws its Bid during the period of Bid Validity as specified by the Procuring agency/Employer, and referred by the bidder on the Form of Bid except as provided for in <b>ITB 18.2</b>; or</li> <li>ii) Does not accept the correction of errors pursuant to <b>ITB 32</b>; or</li> </ul> </li> <li>b) In the case of a successful bidder, if the bidder fails: <ul style="list-style-type: none"> <li>i) to sign the contract in accordance with <b>ITB 47</b>; or</li> <li>ii) to furnish performance security (or guarantee) in accordance with <b>ITB 48</b>.</li> </ul> </li> </ul>
	19.10	In case of Bid Security issued by the foreign bank is allowed by the Procuring agency/Employer, the same should be counter guaranteed by a corresponding bank in Pakistan. Furthermore, in case of joint venture, it should be in the name of Joint venture to ensure joint responsibility.
<b>20. Alternative Bids by Bidders</b>	20.1	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 Bill of Quantities. Alternatives will not be considered, unless specifically allowed for in the <b>BDS</b> . If so allowed, <b>ITB 20</b> shall prevail.

	20.2	When alternative schedule for execution of works is explicitly invited, a statement of that effect will be included in the <b>BDS</b> as will the method for evaluating different schedule for execution of works.
	20.3	If so allowed in the <b>BDS</b> , 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/Employer, 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/Employer.
<b>21. Withdrawal of Bids</b>	21.1	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 must accompany the respective written notice.
	21.2	Bids requested to be withdrawn in accordance with <b>ITB 21.1</b> shall be returned unopened to the bidders.
<b>22. Format and Signing of Bid</b>	22.1	The Bidder shall prepare the bid as specified in the BDS. The bid shall be submitted electronically through the e-PADS system, and in the event of any discrepancy, the electronically submitted shall prevail.
	22.2	The bid shall be submitted electronically through the e-PADS system and shall be electronically signed by the Bidder or by a person duly authorized to sign on behalf of the Bidder. Such authorization shall be supported by a written authorization/confirmation as specified in the BDS, which shall be uploaded with the bid. The name and designation of the authorized signatory shall be clearly indicated. All documents forming part of the bid shall be digitally authenticated by the authorized signatory, except for un-amended printed literature uploaded for reference.
	22.3	Any interlineations, erasures, or overwriting shall be valid only if they are signed by the person(s) authorized for signing the Bid.

#### **D. SUBMISSION OF BIDS**

<b>23. Sealing and</b>		
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<b>Marking of Bids</b>		
	23.3	a) The Bid shall comprise two separate submissions made electronically through the e-PADS system, one titled the Technical Proposal and the other the Financial Proposal. Both proposals shall be submitted separately in accordance with the procedures specified in the BDS: The bidder shall submit the Technical Proposal and Financial Proposal separately on EPADS, in accordance with the bidding instructions. Each proposal shall be uploaded independently as required under the EPADS submission process.
<b>24. Deadline for Submission of Bids</b>	24.1	Bids shall be submitted on EPADS to the Procuring Agency/Employer no later than the date and time specified in the BDS
	24.2	The Procuring agency/Employer may, under exceptional circumstances and at its discretion, extend the deadline for the submission of bids by amending the Bidding Documents in accordance with <b>ITB 9</b> , in which case all rights and obligations of the Procuring agency/Employer and bidders previously subject to the deadline will thereafter be subject to the new deadline.
<b>25. Late Bids</b>	25.1	The Procuring Agency/Employer shall not consider for evaluation any bid submitted on EPADS after the deadline for submission of bids, in accordance with ITB 24. Furthermore, if the Bid Security is received after the opening of bids, such bid shall not be considered for evaluation.
<b>26. Substitution and Modification of bids</b>	26.1	A bidder may modify or substitute its bid on EPADS after submission, provided that such modification or substitution is made before the deadline for submission of bids, in accordance with the EPADS procedures
	26.2	A revised bid may be submitted on EPADS after substitution or modification has been made to the original bid, in accordance with the provisions of ITB 22

#### **E. OPENING AND EVALUATION OF BIDS**

<b>27. Opening of Bids</b>	27.1	The Procuring agency/Employer 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 <b>BDS</b> . The bidders' representatives present shall sign an attendance sheet as a proof of their attendance.
	27.6	The Procuring agency/Employer will open the Technical Proposals in public at the address, date and time specified in the <b>BDS</b> 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 on EPADS of the Procuring agency/Employer until the specified time of their opening.
	27.7	The Technical Proposals submitted on EPADS shall be opened electronically, one at a time, and the following shall be read out and recorded: (a) the name of the bidder; (b) the presence of a Bid Security or Bid Securing Declaration, if required; and (c) any other details as the Procuring Agency/Employer may consider appropriate
	27.8	Bids not opened and not read out at the bid opening shall not be considered further for evaluation, irrespective of the circumstances.
	27.9	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/Employer against any claim or failure to read out the correct information contained in the bidder's bid.
	27.10	The Procuring Agency/Employer shall not consider for evaluation any bid submitted on EPADS after the deadline for submission of bids, in accordance with ITB 24. Furthermore, if the Bid Security is received after the opening of bids, such bid shall not be considered for evaluation.
	27.11	The Procuring agency/Employer 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 and the presence or absence of a Bid Security or Bid Securing Declaration.
	27.12	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.
	27.13	A copy of the minutes of the bid opening shall be furnished to individual bidders upon request.
	27.14	After the announcement of the Technical Evaluation Report, the Procuring Agency/Employer shall, within the bid validity period, electronically open the Financial Proposals on EPADS

		of only those bidders declared technically responsive. The Financial Proposals of bidders found technically non-responsive shall not be opened/Considered on EPADS, except for those aggrieved bidder(s) whose complaints are pending before the Grievance Redressal Committee
<b>28. Confidentiality</b>	28.1	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.
	28.2	Any effort by a bidder to influence the Procuring agency/Employer processing of bids or award decisions may result in the rejection of its bid.
	28.3	Notwithstanding <b>ITB 28.2</b> from the time of bid opening to the time of contract award, if any bidder wishes to contact the Procuring agency/Employer 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.
<b>29. Clarification of Bids</b>	29.1	To assist in the examination, evaluation and comparison of bids, the Procuring agency/Employer may, ask any bidder for a clarification of its bid including breakdown of prices invariably in writing. Any clarification submitted by a bidder that is not in response to a request by the Procuring agency/Employer shall not be considered.
	29.2	The request for clarification and the response shall be in electronic forms that provide record of the content of communication. No change in the prices or substance of the bid shall be sought, offered, or permitted, except clarification for the correction of arithmetic and mathematical errors discovered by the Procuring agency/Employer during the evaluation of bids which shall be sought in accordance with <b>ITB 32</b> .
	29.3	The alteration or modification in the bid which in any case affect the following parameters will be considered as a change in the substance of a bid: <ul style="list-style-type: none"> <li>a) evaluation &amp; qualification criteria;</li> <li>b) required scope of work;</li> <li>c) contract price;</li> <li>d) all securities requirements;</li> <li>e) tax requirements;</li> <li>f) Terms and conditions of bidding documents.</li> <li>g) change in the ranking of the bidder</li> </ul>
	29.4	From the time of bid opening to the time of Contract award if

		any bidder wishes to contact the Procuring agency/Employer on any matter related to the bid it should do so in electronic forms that provide record of the content of communication.
<b>30. Preliminary Examination of Bids</b>	30.1	<p>Prior to the detailed evaluation of bids, the Procuring agency/Employer will determine whether each bid:</p> <ul style="list-style-type: none"> <li>a) meets the eligibility criteria defined in <b>ITB 3</b> and <b>ITB 4</b>;</li> <li>b) has been prepared as per the format and contents defined by the Procuring agency/Employer in the bidding documents;</li> <li>c) has been properly signed;</li> <li>d) is accompanied by the required securities; and</li> <li>e) is substantially responsive to the requirements of the bidding documents.</li> </ul> <p>The Procuring agency/Employer's determination of a bid's substantial responsiveness will be based on the contents of the bid itself.</p>
	30.2	<p>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: -</p> <ul style="list-style-type: none"> <li>a) affects in any substantial way the scope, quality, or performance of the Works;</li> <li>b) limits in any substantial way, inconsistent with the bidding documents, the Procuring agency/Employer's rights or the bidders' obligations under the Contract; or</li> <li>c) if rectified, would affect unfairly the competitive position of other bidders presenting substantially responsive bids.</li> </ul>
	30.3	<p>The Procuring agency/Employer will confirm that the documents and information specified under <b>ITB 11, 12</b> and <b>13</b> 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.</p>
	30.4	<p>The Procuring agency/Employer 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.</p> <p><i><b>Explanation:</b> A minor informality, non-conformity or</i></p>

		<p><i>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 works. The Procuring agency/Employer 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/Employer. Examples of minor informalities or irregularities include failure of a bidder to –</i></p> <p>(a) <i>Submit the number of copies of signed bids required by the invitation;</i></p> <p>(b) <i>Furnish required information concerning the number of its employees;</i></p> <p>(c) <i>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.</i></p>
	30.5	<p>Provided that a Technical Bid is substantially responsive on EPADS, the Procuring agency/Employer 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.</p>
	30.6	<p>Provided that a Technical Bid is substantially responsive, the Procuring agency/Employer 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.</p>
	30.7	<p>If a bid is not substantially responsive, it will be rejected by the Procuring agency/Employer and may not subsequently be evaluated for complete technical responsiveness.</p>

<p><b>31. Examination of Terms and Conditions; Technical Evaluation</b></p>	<p>31.1</p>	<p>The Procuring agency/Employer shall examine the bid to confirm that all terms and conditions specified in the <b>GCC</b> and the <b>SCC</b> have been accepted by the bidder without any material deviation or reservation.</p> <p>For this purpose:  “Deviation” means departure from the requirements specified in the Bidding Document.  “Reservation” means setting of limiting conditions or withholding from complete acceptance of the requirements specified in the Bidding Document.</p>
	<p>31.2</p>	<p>The Procuring agency/Employer shall evaluate the technical aspects of the bid submitted in accordance with <b>ITB 31</b>, to confirm that all requirements specified in <b>Section V – Works Requirement, Technical Specifications of</b> the Bidding Documents have been met without material deviation or reservation.</p>
	<p>31.3</p>	<p>If after the examination of the terms and conditions and the technical evaluation, the Procuring agency/Employer determines that the bid is not substantially responsive in accordance with <b>ITB 30</b>, it shall reject the bid.</p>

<p><b>32. Correction of Arithmetic Errors</b></p>	<p>32.1</p>	<p>Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -</p> <ul style="list-style-type: none"> <li>a) if there is a discrepancy between unit prices and the sub-total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail, and the sub-total price shall be corrected, unless in the opinion of the Procuring agency/Employer 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;</li> <li>b) 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</li> <li>c) where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.</li> <li>d) 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.</li> </ul>
	<p>32.2</p>	<p>The amount stated in the Bid will, be rectified by the Procuring agency/Employer in accordance with the above procedure for the correction of errors and, with, the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount, its bid shall be rejected after forfeiture of Bid Security or execution of the Bid Securing Declaration, as the case may be, in accordance with <b>ITB 19.9.</b></p>

<p><b>33. Conversion to Single Currency</b></p>	<p>33.1</p>	<p>The unit rates and the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works from outside the Procuring agency/Employer’s country (referred to as the “Foreign Currency Requirements”) shall indicate the same in the letter of bid-financial proposal. The proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements either (i) entirely in the currency of the Bidder’s home country or, (ii) at the bidder’s option, entirely in Pak rupees provided always that a bidder expecting to incur expenditures in a currency or currencies other than those stated in (i) and (ii) above for a portion of the foreign currency requirements, and wishing to be paid accordingly, shall indicate the respective portions in his bid.</p>
	<p>33.2</p>	<p>To facilitate evaluation and comparison, the Procuring agency/Employer 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.</p>
	<p>33.3</p>	<p>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 <b>BDS</b>.</p>
<p><b>34. Evaluation of Bids</b></p>	<p>34.1</p>	<p>The Procuring agency/Employer shall evaluate and compare only the bids determined to be substantially responsive, pursuant to <b>ITB 30</b>.</p>
	<p>34.2</p>	<p>In evaluating the Technical Proposal of each Bid, the Procuring agency/Employer shall use the criteria and methodologies listed in the <b>BDS</b> and in terms of works requirement. No other evaluation criteria or methodologies shall be permitted.</p>
	<p>34.3</p>	<p>The Procuring agency/Employer’s evaluation of a bid will take into account:</p> <ul style="list-style-type: none"> <li>a) the bid price, excluding provisional sums and the provision, if any, for contingencies in the summary bill of quantities, but including day work items, where priced competitively;</li> <li>b) price adjustment for correction of arithmetic errors in</li> </ul>

		<p>accordance with <b>ITB 32.1</b>;</p> <p>c) converting the amount resulting from applying (a) and (b) above, if relevant, to a single currency in accordance with <b>ITB 33</b>;</p>
	34.4	The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in bid evaluation.
	34.5	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 in the Form of Bid, is specified in the <b>BDS</b> .
	34.6	<p>If the bid, which results in the Evaluated Bid Price (Most Advantageous Bid), is seriously unbalanced or front loaded in the opinion of the Employer, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities, to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, taking into consideration the schedule of estimated Contract payments, the Employer may require that the amount of the performance security be increased at the expense of the Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract.</p> <p><b>Explanation:</b>  <i>“Unbalanced” or “front-loaded” bids consist of deliberately submitting bids with artificially high prices or unit rates for the early stages of a construction project, offset by artificially low prices or unit rates for the later stages of the project, to improve the contractor’s cash flow.</i></p>

<b>35. Domestic Preference</b>	35.1	If the <b>BDS</b> so specifies, the Procuring agency/Employer will grant a margin of preference to the domestic contractor in line with the rules, regulations, regulatory guides or instructions issued by the Authority from time to time.
<b>36. Determination of Most Advantageous Bid</b>	36.1	The Procuring agency/Employer shall compare the evaluated bids in accordance with the predefined bidding procedure, of all substantially responsive bids to determine the Most Advantageous bidder.
<b>37. Qualification of Bidder</b>	37.1	<p>The Procuring agency/Employer shall determine to its satisfaction whether the bidder is substantially responsive and whose bid is declared as most advantageous bid either continues to meet (if prequalification applies) or meets (if post-qualification applies) the qualifying criteria specified in Evaluation and Qualification Criteria.</p> <p><i>Note: In case of International bidding, the parameters for incorporation or licensing within Pakistan may be fulfilled as part of post qualification.</i></p>
	37.2	The determination shall be based upon an examination of the documentary evidence of the bidder’s qualifications submitted by the bidder, pursuant to <b>ITB 12</b> .
	37.3	Prior to contract award, the Procuring agency/Employer will verify that the successful bidder (including each member of a JV) is not blacklisted/debarred. The Procuring agency/Employer will conduct the same verification for each sub-contractor proposed by the successful bidder.
<b>38. Sub-Contractors</b>	38.1	The bidder shall provide details regarding any specialized sub-contractor to the Procuring agency/Employer. In case change of sub-contractors, the bidder shall promptly notify the Procuring agency/Employer and obtain approval for replacement of sub-contractors.
	38.2	Bidders may propose sub-contracting up to the percentage of total value of contracts or the volume of works as specified in the <b>BDS</b> .

<p><b>39. Abnormally Low Financial Bid</b></p>	<p>39.1</p>	<p>Where the bid price is considered to be abnormally low, the Procuring agency/Employer 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:</p> <ul style="list-style-type: none"> <li>a) The Procuring agency/Employer may reject a bid if the Procuring agency/Employer 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;</li> <li>b) Before rejecting an abnormally low bid the Procuring agency/Employer shall request the bidder an explanation of the bid or of those sections 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;</li> <li>c) The decision of the Procuring agency/Employer to reject a bid and reasons for the decision shall be recorded in the procurement proceedings and promptly communicated to the bidder concerned;</li> <li>d) The Procuring agency/Employer shall not incur any liability solely by rejecting abnormally bid; and</li> <li>e) An abnormally low bid means, in the light of the Procuring agency/Employer’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.</li> </ul> <p><b>Guidance for Procuring agency/Employer:</b> In order to identify the Abnormally Low Bid (ALB) following approaches can be considered to minimize the scope of subjectivity:</p> <ul style="list-style-type: none"> <li>(i) Comparing the bid price with the cost estimate;</li> <li>(ii) Comparing the bid price with the bids offered by other bidders submitting substantially responsive bids; and</li> <li>(iii) Comparing the bid price with prices paid in similar contracts in the recent past either government- or development partner-funded.</li> </ul>
	<p>39.2</p>	<p>The Procuring agency/Employer will determine to its satisfaction whether the bidder that is selected as having submitted the most advantageous bid is qualified to perform</p>

		the contract satisfactorily, in accordance with the criteria listed in <b>ITB 12</b>
	39.3	The determination will take into account the bidder's financial and technical capabilities. It will be based upon an examination of the documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to <b>ITB 12</b> , as well as such other information as the Procuring agency/Employer deems necessary and appropriate. Factors not included in these bidding documents shall not be used in the evaluation of the bidders' qualifications.
	39.4	Procuring agency/Employer may seek "Certificate for Independent Price Determination" from the bidder and the results of reference checks may be used in determining award of contract.  <i><b>Explanation:</b> 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.</i>
	39.5	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/Employer will proceed to the next ranked bidder to make a similar determination of that bidder's capabilities to perform satisfactorily.

## F. AWARD OF CONTRACT

<p><b>40. Criteria of Award</b></p>	<p>40.1</p>	<p>Subject to <b>ITB 36</b> and <b>37</b>, the Procuring agency/Employer 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:</p> <ul style="list-style-type: none"> <li>a) eligible in accordance with the provisions of <b>ITB 3</b>;</li> <li>b) is determined to be qualified to perform the Contract satisfactorily; and</li> <li>c) Successful negotiations have been concluded, if any.</li> </ul>
<p><b>41. Negotiations</b></p>	<p>41.1</p>	<p>The Committee of the Procuring agency/Employer may negotiate with the Most Advantageous Bidder relating to the following areas:</p> <ul style="list-style-type: none"> <li>(a) a minor alteration to the technical (drawings, design technical specifications) details of the statement of works;</li> <li>(b) Methodology, work plan, staffing in view to streamline the work;</li> <li>(c) a minor amendment to the special conditions of Contract;</li> <li>(d) finalizing payment arrangements;</li> <li>(e) clarifying details that were not apparent or could not be finalized at the time of Bidding;</li> </ul>
	<p>41.2</p>	<p>Where negotiation fails to result into an agreement, the Procuring agency/Employer may invite the next ranked bidder for negotiations. Where negotiations are commenced with the next ranked bidder, the Procuring agency/Employer shall not reopen earlier negotiations.</p>
<p><b>42. Procuring agency/Employer's Right to reject All Bids</b></p>	<p>42.1</p>	<p>Notwithstanding <b>ITB 37</b>, the Procuring agency/Employer reserves the right to reject all the bids, and to annul the bidding process at any time prior to acceptance of bid, without thereby incurring any liability to the affected bidder(s). However, the Authority (i.e. PPRA) may call from the Procuring agency/Employer the justification of those grounds.</p>
	<p>42.2</p>	<p>Notice of the rejection of all bids shall be given promptly to all bidders that have submitted bids.</p>
	<p>42.3</p>	<p>The Procuring agency/Employer shall upon request communicate to any bidder the grounds for its rejection of its bids, but is not required to justify those grounds.</p>

<b>43. Variations</b>	43.1	<p>The Engineer shall make any variation in the quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:</p> <ol style="list-style-type: none"> <li>a) increase or decrease the quantity of any work included in the Contract,</li> <li>b) omit any such work (but not if the omitted work is to be carried out by the Employer or by another contractor),</li> <li>c) change the character or quality or kind of any such work,</li> <li>d) change the levels, lines, position and dimensions of any part of the Works,</li> <li>e) execute additional work of any kind necessary for the completion of the Works, or</li> <li>f) change any specified sequence or timing of construction of any part of the Works.</li> </ol> <p>No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with <b>ITB 15</b>. Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.</p>
<b>44. Instructions for variations</b>	44.1	<p>The Contractor shall not make any such variation without an instruction of the Engineer. Provided that no instruction shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this Clause, but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities.</p>
<b>45. Valuation of Variations</b>	45.1	<p>All variations and any additions to the Contract Price which are required to be determined in accordance with <b>ITB 15</b> (for the purposes of this Clause referred to as "varied work"), shall be valued at the rates and prices set out in the Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the varied work, the rates and prices in the Contract shall be used as the basis for valuation so far as may be reasonable, failing which, after due consultation by the Engineer with the Procuring agency/Employer and the Contractor, suitable rates or prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement, the Engineer shall fix such rates or prices as are, in his opinion, appropriate and shall</p>

		notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with <b>ITB 15</b> .
<b>46. Notification of Award</b>	46.1	Prior to the award of contract, the Procuring agency/Employer shall issue a Final Evaluation Report giving justification for acceptance or rejection of the bids.
	46.2	Where no complaints have been lodged, the bidder whose bid has been accepted will be notified of the award by the Procuring agency/Employer prior to expiration of the bid validity period in writing or through electronic means that provide record of the content of communication. However, the Procuring agency/Employer shall not award any procurement contract atleast for fifteen (15) days after the acceptance of bid. The notification letter (herein after and in the condition of the contract and contract form called "Letter of Acceptance" will specify the sum that the Procuring agency/Employer will pay the successful bidder in consideration for the execution and completion of the works as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price).
	46.3	The notification of award will constitute the formation of the Contract, subject to the bidder furnishing the Performance Security (or guarantee) in accordance with <b>ITB 48</b> and signing of the contract in accordance with <b>ITB 47</b> .
	46.4	Upon the successful bidder's furnishing of the performance security (or guarantee) pursuant to <b>ITB 48</b> , the Procuring agency/Employer 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 bidder(s) pursuant to <b>ITB 19</b> .
<b>47. Signing of Contract</b>	47.1	Promptly after notification of award, Procuring agency/Employer shall send the successful bidder the draft agreement, incorporating all terms and conditions as agreed by the parties to the contract.
	47.2	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/Employer shall sign the contract.
	47.3	Where no formal signing of a contract is required, work order issued to the bidder shall be construed to be the contract.

<b>48. Performance Security (or Guarantee)</b>	48.1	After the receipt of the Letter of Acceptance, the successful bidder, within the specified time, shall deliver to the Procuring agency/Employer a Performance Guarantee in the amount and in the form stipulated in the <b>BDS and SCC</b> , denominated in the type and proportions of currencies in the Letter of Acceptance and in accordance with the Conditions of Contract.
	48.2	If the Performance Guarantee is provided by the successful bidder and it shall be in the form specified in the <b>BDS</b> which shall be in any of the following: (a) Call Deposit/Bank Draft
	48.3	Failure of the Most Advantageous Bidder to comply with the requirement of <b>ITB 47</b> shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security or declare blacklisted (in case bid securing declaration is submitted) in which event the Procuring agency/Employer may make the award to the next most advantageous bidder or reinitiate the procurement process afresh (as a case may be).
<b>49. General Performance of the Bidders</b>	50.1	The Procuring agency/Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts / works. The Procuring agency/Employer may seek information / report from the previous employer for consideration. However, the Procuring agency/Employer shall incorporate such parameters in the evaluation criteria and accordingly decide the fate of the bid submitted.
<b>50. Corrupt &amp; Fraudulent Practices</b>	51.1	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.

**F. GRIEVANCE REDRESSAL & COMPLAINT REVIEW MECHANISM**

<b>51. Constitution of Grievance Redressal</b>	52.1	Procuring agency/Employer shall constitute a Grievance Redressal Committee (GRC) comprising of odd number of persons 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.
<b>52. GRC Procedure</b>	53.1	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.

	53.2	Any bidder feeling aggrieved by any act of the Procuring agency/Employer 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.
	53.3	In case, the complaint is filed against the technical evaluation report, the GRC shall suspend the procurement proceedings.
	53.4	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.
	53.5	The GRC, in both the cases shall investigate and decide upon the complaint within ten days of its receipt.
	53.6	Any bidder or the Procuring agency/Employer 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.
	53.7	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.
	53.8	The committee shall call the record from the concerned Procuring agency/Employer or the GRC as the case may be, and the same shall be provided within prescribed time.
	53.9	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.
	53.10	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.

## G. MECHANISM OF BLACKLISTING

<p><b>53. Mechanism of Blacklisting</b></p>	<p>54.1</p>	<p>The Procuring agency/Employer 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: Involved in corrupt and fraudulent practices as defined in Rule-2 of Public Procurement Rules; i) Fails to perform his contractual obligations; and ii) Fails to abide by the id securing declaration;</p>
	<p>54.2</p>	<p>The show cause notice shall contain: (a) precise allegation, against the bidder or contractor; (b) the maximum period for which the Procuring agency/Employer proposes to debar the bidder or contractor from participating in any public procurement of the Procuring agency/Employer; and (c) the statement, if needed, about the intention of the Procuring agency/Employer to make a request to the Authority for debarring the bidder or contractor from participating in public procurements of all the procuring agencies.</p>
	<p>54.3</p>	<p>The Procuring agency/Employer shall give minimum of seven days to the bidder or contractor for submission of written reply of the show cause notice.</p>
	<p>54.4</p>	<p>In case, the bidder or contractor fails to submit written reply within the requisite time, the Procuring agency/Employer may issue notice for personal hearing to the bidder or contractor/ authorize representative of the bidder or contractor and the Procuring agency/Employer shall decide the matter on the basis of available record and personal hearing, if availed.</p>
	<p>54.5</p>	<p>In case the bidder or contractor submits written reply of the show cause notice, the Procuring agency/Employer may decide to file the matter or direct issuance of a notice to the bidder or contractor for personal hearing.</p>
	<p>54.6</p>	<p>The Procuring agency/Employer shall give minimum of seven days to the bidder or contractor for appearance before the designated officer of the Procuring agency/Employer for personal hearing. The designated officer shall decide the matter on the basis of the available record and personal hearing of the bidder or contractor, if availed.</p>

	54.7	The Procuring agency/Employer shall decide the matter within fifteen (15) 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.
	54.8	The Procuring agency/Employer shall communicate to the bidder or contractor the order of debaring the bidder or contractor from participating in any public procurement with a statement that the bidder or contractor may, within thirty (30) days, prefer a representation against the order before the Authority.
	54.9	Such blacklisting or barring action shall be communicated by the Procuring agency/Employer 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/Employer.
	54.10	The bidder may file the review petition before the Review Petition Committee Authority within thirty (30) 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 (90) days of filing of review petition.
	54.11	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/Employer. 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.
	54.12	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**

## *Bid Data Sheet (BDS)*

The following specific data for the procurement of works shall complement, supplement, or amend the provisions in the Instructions to Bidders (ITBs). Whenever there is a conflict, the provisions herein shall prevail over those in ITBs.

<b>BDS Clause Number</b>	<b>ITB Number</b>	<b>Amendments of, and Supplements to, Clauses in the Instruction to Bidders</b>
<b>A. Introduction</b>		
<b>1.</b>	<b>1.1</b>	<p>Name of Procuring agency/Employer: “STATE LIFE INSURANCE CORPORATION OF PAKISTAN”.</p> <p>The subject of procurement is: “REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN”.</p> <p>Period for completion of the works <b>180- DAYS</b></p> <p><b>Defect Liability Period: 1 Year</b></p> <p>Commencement date execution of the works: Within Seven days after signing of agreement</p> <p>Type of Procurement <b>SINGLE STAGE-TWO ENVELOP PROCEDURE</b></p>
<b>2.</b>	<b>2.1</b>	<p>Financial year for the operations of the Procuring agency/Employer: 2026-2027</p> <p>Name of Project “REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN.”</p> <p>Name of financing institution: “STATE LIFE INSURANCE CORPORATION OF PAKISTAN</p> <p>Name and identification number of the Contract:</p> <p>“REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN”.</p> <p><b>CONTRACT ID#</b> LOT-A: RED-LHR-LIFT-SLB-MULTAN-09-2026                      LOT-B: RED-LHR-CIVIL-SLB-MULTAN-09-2026</p> <p><b>Note:</b>                      The tender will be dealt with separately in terms of technical and financial evaluation criteria and each lot will be awarded separately (independent of other) to the most advantageous bidder.</p>

<b>3.</b>	<b>3.1</b>	Joint venture, Consortium: <b>NOT ALLOWED</b>

## B. Bidding Documents

4.	7.2	The number of copies to be completed and submitted online is one original.
5.	8.1	The address for clarification of Bidding Documents is 1ST FLOOR REAL ESTATE DEPARTMENT STATE LIFE BUILDING #11 DAVIS ROAD LAHORE.

## C. Preparation of Bids

6.	10.1	The Language of all correspondences and documents related to the Bid is English
7.	11.1 (i)	In addition to the documents stated in <b>ITB 11</b> , the following documents must be included with the Bid <ul style="list-style-type: none"> <li>i) Covering letter (<i>Annexure-A</i>) duly signed and stamped by authorized representative.</li> <li>ii) Copy of Income Tax &amp; GST Registration Certificate</li> <li>iii) Copy of PRA and PEC (C-5 WITH CE-01 &amp; ME-03 or above) Registration Certificate.</li> <li>iv) Detailed specification of items.</li> <li>v) Bank statement showing financial strength</li> <li>vi) Detail of clients(Work orders)</li> </ul>
8.	11.5 (c)	Other procurement specific documentation requirements are:  An affidavit on a stamp paper of Rs.200/- will be attached with the bid that the firm is not black listed at PPRA, suspended or removed in any Government, Semi Government, Autonomous Bodies, Public sector university and any other Department.
9.	15.5	The bid price shall be adjusted in accordance with Appendix A – Formula for Price Adjustment. NOT APPLICABLE
10.	15.6	Name of the works “ <b>REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN</b> ”.  The identification No.: <b>LOT-A: RED-LHR-LIFT-SLB-MULTAN-09-2026</b> <b>LOT-B: RED-LHR-CIVIL-SLB-MULTAN-09-2026</b>
11.	16.1	The currency of the Bid shall be in PKR. The unit rates and

		the prices shall be quoted by the bidder entirely in Pak rupees. A bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country shall bear all costs and risks for arranging the requirement of such currencies through his own resources. The currency of payment is Pak Rupees only.
<b>12.</b>	<b>18.1</b>	Period for bid validity is 120 days after the date of bid opening.
<b>13.</b>	<b>19.1</b>	The Bids should be accompanied by bid security amount for the Lot-A <b>Rs. 640,000/-</b> and Lot-B <b>Rs. 375,000/-</b> in the form of DD/ CDR in favor of "STATE LIFE INSURANCE CORPORATION OF PAKISTAN should reach in the Office by <b>30-06-2026 before 11:00 AM.</b>  The currency of the Bid Security shall be Pak Rupees.
<b>14.</b>	<b>19.3</b>	The Bid Security shall be in the form of DD/ CDR
<b>15.</b>	<b>19.3 (c)</b>	Other forms of security are NIL
<b>16.</b>	<b>20.1</b>	Alternative Bids to the requirements of the Bidding Documents will not be permitted.
<b>17.</b>	<b>20.2</b>	If alternative scheduled for execution of work is explicitly invited (please insert the method for evaluation of different schedules for execution of works)
<b>18.</b>	<b>22.1</b>	The Bid to be completed and submitted online shall be only one
<b>19.</b>	<b>22.2</b>	The written confirmation of authorization to sign on behalf of the Bidder shall consist of Power of attorney duly signed and stamp on letter head.

#### **D. Submission of Bids**

<b>20.</b>	<b>23.2 (a)</b>	1. Bids Technical and Financial required to be submitted online up to <b>30-06-2026 before 11:00AM on E-PADS</b> and Technical Bids will be <b>opened on same date at 11:30 AM.</b>
<b>21.</b>	<b>23.2 (b)</b>	Title of the subject Procurement or Project name: <b>"REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONGWITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN".</b>

		<p>ITB title and No:  <b>LOT-A: RED-LHR-LIFT-SLB-MULTAN-09-2026</b>  <b>LOT-B: RED-LHR-CIVIL-SLB-MULTAN-09-2026</b>  Time and date for submission: <b>30-06-2026 before 11:00A.M</b></p>
22.	24.1	<p>The deadline for Bid submission is</p> <p>a) Date:30-06-2026</p> <p>b) Time:11:00A.M</p>

### E. Opening and Evaluation of Bids

23.	27.1	<p>The Bid opening shall take place at:</p> <p>Conference room</p> <p>1ST FLOOR REAL ESTATE DEPARTMENT STATE LIFE BUILDING #11 DAVIS ROAD LAHORE.</p> <p>City/Town: <i>LAHORE</i></p> <p>Country: Pakistan</p> <p>Date: 30-06-2026</p> <p>Time : <i>11:30A.M</i></p>
24.	33.2	<p>The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid prices expressed in various currencies is: Not Applicable</p> <p>The source of exchange rate shall be: Not Applicable</p> <p>The date of exchange rate shall be: Not Applicable</p>
25.	33.3	The bids shall be quoted in Pak Rupees Only
26.	34	<p><b>Evaluation Techniques</b></p> <p><b>Least Cost Based Selection (LCBS)</b></p> <p>After meeting the requirements of eligibility, qualification and substantial responsiveness, the bid in compliance with all the mandatory (drawings/ design/ technical specifications /requirements and/or requisite quality threshold (if any), and having lowest evaluated cost (or financial proposal) shall be considered highest ranked bid.</p>
27.	34	Specific criteria in case evaluating the bids submitted by JVs and consortium to be used in the evaluation and their

		evaluation method or reference to the Technical Specifications.
<b>28.</b>	34	In case of award to a single Bidder of multiple lots; the methodology of evaluation to determine the lowest evaluated Lot combinations, in the Form of Bid is “The bidder may get multiple lots, but only if the combined price of those lots is the lowest when evaluated together”
<b>29.</b>	<b>35</b>	Domestic preference to apply. Preference to domestic or national suppliers or contractors shall be provided in accordance with policies of the Federal Government and/or in accordance with the regulations issued by the Authority.
<b>30.</b>	<b>38.2</b>	Sub-contracting (please insert percentage) of the total value of the contract.

#### **F. Award of Contract**

<b>31.</b>	<b>48</b>	The Performance Security (or guarantee) shall be <i>10 percent of the Contract Price</i>
<b>32.</b>	<b>48</b>	The Performance Security (or guarantee) shall be in the form DD/ CDR in favor of “STATE LIFE INSURANCE CORPORATION OF PAKISTAN should reach in the Office by 30-06-2026 before 11:00 AM

#### **G. Review of Procurement Decisions**

<b>33.</b>	<b>53.6</b>	The Address of PPRA to submit a <b>copy</b> of appeal:  Grievance Redressal Appellate Committee, Public Procurement Regulatory Authority 1 <sup>st</sup> Floor, G-5/2, Islamabad, Pakistan Tel: +92-51-9202254
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## **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

## **Section V. Evaluation and Qualification Criteria**

The Procuring agency/Employer shall evaluate the bids in accordance with predefined evaluation and qualification criteria mentioned in this document. No other factors, methods or criteria shall be used. The Bidder shall provide all the information requested in the forms included in the Bidding Forms.

Wherever a Bidder is required to state a monetary amount, Bidders should indicate the currency prescribed in the BDS. In case of foreign currency, the exchange rates shall be taken from State Bank of Pakistan on that bid opening day. Any error in determining the exchange rates in the Bid may be corrected in accordance with **ITB 32** (Correction of Arithmetic Errors)

### **1. Domestic Preference**

If allowed in the BDS, a margin of preference shall be granted to domestic contractors, in accordance with policy of the Federal Government and guidelines issued by the Authority, and subject to, the following provisions:

- (a) Contractors applying for such preference shall provide, as part of the data for qualification, such information, including details of ownership, as shall be required to determine whether, according to the classification established by the Procuring agency/Employer, a particular contractor or group of contractors qualifies for a domestic preference. The bidding documents shall clearly indicate the preference and the method that will be followed in the evaluation and comparison of bids to give effect to such preference.
- (b) After bids have been received and reviewed by the Procuring agency/Employer, responsive bids shall be classified into the following groups:
  - (i) Group A: bidder eligible for the domestic preference.
  - (ii) Group B: other bidder.
- (c) All evaluated bids in each group shall, as a first evaluation step, be compared to determine the most advantageous bid, and the most advantageous bids in each group shall be further compared with each other. If, as a result of this comparison, a bid from Group A is the most advantageous, it shall be selected for the award. If a bid from Group B is the most advantageous, as a second evaluation step, all bids from Group B shall then be further compared with the most advantageous bid from Group A. For the purpose of this further comparison only, the percentage of price preference of the respective bid price corrected for arithmetical errors, shall be added to the evaluated price offered in each bid from Group B. If the bid from Group A is the most advantageous, it shall be selected for award. If not, the most advantageous bid from Group B based on the first evaluation step shall be awarded the contract.

## Evaluation

In addition to the criteria listed in **ITB 34.3** the following criteria shall be applied for the evaluation of bids:

### **2.1 Assessment of adequacy of Technical Proposal with Requirements**

Evaluation of the Bidder's Technical Proposal will include an assessment of the Bidder's technical capacity to mobilize key equipment and personnel for the contract consistent with its proposal regarding work methods, scheduling, and material sourcing in sufficient detail and fully in accordance with the requirements stipulated in Section V Works Requirements.

### **2.2 Technical Alternatives:**

**Not Applicable**

### **2.3 Multiple Contracts:**

If works are grouped in multiple contracts and pursuant to **ITB 34**, the Procuring agency/Employer shall evaluate and compare Bids on the basis of a contract, or a combination of contracts, or as a total of contracts in order to arrive at the Most advantageous bid for the Procuring agency/Employer by taking into account bids offered by Bidders in case of award of multiple contracts. If a Bidder submits several successful (lowest evaluated substantially responsive) bids, the evaluation will also include an assessment of the Bidder's capacity to meet the following aggregated requirements as presented in the bid:

- 1) Average annual construction turnover,
- 2) Financial resources,
- 3) Equipment to be allocated, and
- 4) Personnel to be fielded

**If permitted under ITB 34, will be evaluated as follows:**

#### **Award Criteria for Multiple Contracts:**

##### **Lots**

If specified in the procurement planning and allowed in the BDS, the Procuring agency/Employer may ask to the bidder to bid for any one or more lots. Bids will be evaluated lot-wise for combined lots. The contract(s) will be awarded to the Bidder or Bidders offering the most advantageous bid to the Procuring agency/Employer for combined lots, subject to the selected Bidder(s) meeting the required qualification criteria for lot or combination of lots as the case may be.

##### **Packages**

If specified in the procurement planning and allowed in the BDS the bidder may choose to Bid for any one or more packages and for any one or more lots within a package. Bids will be evaluated package-wise, for combined packages and/or lots within a package. The contract(s) will be awarded to the Bidder or Bidders offering the most advantageous bid to the Procuring agency/Employer for combined packages, subject to

the selected Bidder(s) meeting the required qualification criteria for combination of packages and or lots as the case may be.

#### 2.4 **Specialized Subcontractors**

Only the specific experience of sub-contractors for specialized works permitted by the Procuring agency/Employer will be considered. The general experience and financial resources of the specialized sub-contractors shall not be added to those of the Bidder for purposes of qualification of the Bidder.

The specialized sub-contractors proposed shall be fully qualified for their work proposed, and meet the following criteria: (*Specify Criteria below*)

**Qualification  
For LOT-A**

Sr. No.	Criteria	Max Marks	Obtained
1.	Registered with Income Tax & GST – Has NTN & GST	Mandatory	Yes/No
2.	PRA and PEC (C-5 WITH CE-01 & ME-03 Codes) Registration	Mandatory	Yes/No
3.	Affidavit to the effect that the firm has never been blacklisted and no litigation history by any Ministry/Division/Department/Organization.	Mandatory	Yes/No
4.	Technical Staff CVs and Capabilities i) Project Manager (BSc Civil Engineer with 07 Years relevant experience)- 5 Marks ii) Mechanical Engineer (BSc Mechanical Engineer with 05 Years relevant experience)-4 Marks iii) Site Supervisor (DAE Civil 05 Years relevant experience)-2 Marks iv) Quantity Surveyor (DAE Civil 05 Years relevant experience)-2 Marks v) Mechanical Supervisor (DAE Mechanical 05 Years relevant experience)-2 Marks	15	
5.	Company Profile (2 Points for each one year experience more than 5 years from registration with P.E.C. but maximum points remains 10)	10	
6.	Average Annual Turnover Last Three Years <ul style="list-style-type: none"> <li>• Rs. 60M or above 20 Marks</li> <li>• Rs. 50 to 60M 15 Marks</li> <li>• Rs. 40 to 50M 10 Marks</li> <li>• &lt;40 (M) 05 Marks</li> </ul> The Bidder must submit its Bank Statement of last one year in support of submitted documents	20	
7.	<ul style="list-style-type: none"> <li>• Similar Projects Completed in Last Five Years</li> </ul>	20	

	<p>with Completion Certificates (of Worth Not Less Than 40M Each)</p> <ul style="list-style-type: none"> <li>• 01 Project = 05 Marks</li> </ul> <p>Minimum 04 Projects to secure full marks</p>		
8.	<p>Similar Projects in Progress with Proof (of Worth Not Less Than 30M Each ):</p> <ul style="list-style-type: none"> <li>• 01 Project = 05 Marks</li> </ul> <p>Minimum 05 Projects to secure full marks.</p>	25	
9.	<ul style="list-style-type: none"> <li>• HSE Policy</li> </ul>	10	

***Passing marks:60***

**Qualification  
For LOT-B**

Sr. No.	Criteria	Max Marks	Obtained
1.	Registered with Income Tax & GST – Has NTN & GST	Mandatory	Yes/No
2.	PRA and PEC C-5 Registration	Mandatory	Yes/No
3.	Affidavit to the effect that the firm has never been blacklisted and no litigation history by any Ministry/Division/Department/Organization.	Mandatory	Yes/No
4.	Technical Staff CVs and Capabilities i) Project Manager (BSc Civil Engineer with 07 Years relevant experience)- 6 Marks ii) Site Supervisor(DAE Civil 05 Years relevant experience)- 3 Marks iii) Quantity Surveyor (DAE Civil 05 Years relevant experience)- 3 Marks iii) Plumber (Diploma with 05 Years relevant experience)- 3 Marks	15	
5.	Company Profile (2 Points for each one year experience more than 5 years from registration with P.E.C. but maximum points remains 10)	10	
6.	Average Annual Turnover Last Three Years <ul style="list-style-type: none"> <li>• Rs. 50M or above 20 Marks</li> <li>• Rs. 40 to 50M 15 Marks</li> <li>• Rs. 30 to 40 10 Marks</li> <li>• &lt;30 (M) 05 Marks</li> </ul> The Bidder must submit its Bank Statement of last one year in support of submitted documents	20	
7.	<ul style="list-style-type: none"> <li>• Similar Projects Completed in Last Five Years with Completion Certificates (of Worth Not Less Than 30M Each)</li> </ul>	20	

	<ul style="list-style-type: none"> <li>• 01 Project = 05 Marks</li> </ul> <p>Minimum 04 Projects to secure full marks</p>		
8.	<p>Similar Projects in Progress with Proof (of Worth Not Less Than 20M Each ):</p> <ul style="list-style-type: none"> <li>• 01 Project = 05 Marks</li> </ul> <p>Minimum 05 Projects to secure full marks.</p>	25	
9.	<ul style="list-style-type: none"> <li>• HSE Policy</li> </ul>	10	

***Passing marks:60***

## Contractor's Representative and Key Personnel

The Bidder must demonstrate that it will have a suitably qualified Contractor's Representative and suitably qualified (and in adequate numbers) Key Personnel, as described in the Specification.

The Bidder shall provide details of the Representative and Key Personnel and such other Key Personnel that the Bidder considers appropriate to perform the Contract, together with their academic qualifications and work experience. The Bidder shall complete the relevant Forms in the Bidding Forms.

## Equipment

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

No.	Equipment Type and Characteristics	Minimum Number required
1	Excavator Machine & Compactor	1
2	Concrete Mixer	<u>2</u>
3	Vibrators	<u>4</u>
4	Steel Formwork & Scaffolding	<u>15,000 Sft</u>
5	Testing Equipment	<u>1-Set</u>
6	Loader	<u>1</u>
7	Tractor	<u>1</u>
8	Vertical hoist	<u>2</u>
9	Health and safety equipment	

The Bidder shall provide further details of proposed items of equipment using Form EQU in Section V.

**SECTION V: WORKS REQUIREMENT, TECHNICAL  
SPECIFICATIONS, DRAWINGS, SUPPLEMENTARY INFORMATION  
AND BILL OF QUANTITIES**

### **Scope of Works**

The Work under this contract comprises of the

**“REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH SUPPLYING, INSTALLATION, TESTING AND COMMISSIONING OF LIFT ALONG WITH CIVIL/MECHANICAL STRUCTURE AND MISCELLANEOUS WORKS AT SLB, MULTAN”**

## Technical Specifications

### **Notes for Preparing the Technical Specifications**

A set of precise and clear specifications is a prerequisite for bidders to respond realistically and competitively to the requirements of the Procuring agency/Employer without qualifying their bids. The specifications must be drafted to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship and materials for the works to be procured. Only if this is done will the objectives of economy, efficiency, and fairness in procurement be realized, responsiveness of bids be ensured, and the subsequent task of bid evaluation facilitated.

Samples of specifications from previous similar procurements are useful in this respect. The use of metric units is encouraged. Depending on the complexity of the works and the repetitiveness of the type of procurement, it may be advantageous to standardize the General Technical Specifications and incorporate them in a separate subsection. The General Technical Specifications should cover all classes of workmanship, materials, and equipment commonly involved in the procurement of works, although not necessarily to be used in a particular procurement. Deletions or addenda should then adapt the General Technical Specifications to the particular procurement.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for equipment, materials, and workmanship, recognized international standards should be used as much as possible. Where other particular standards are used, whether national standards of the Procuring agency/Employer's country or other standards, the specifications should state that equipment, materials, and workmanship that meet other authoritative standards, and which ensure at least a substantially equal quality than the standards mentioned, will also be acceptable. The following clause may be inserted in the Special Conditions of Contract or the Technical Specifications.

### **Sample Clause: Equivalency of Standards and Codes**

Wherever reference is made in the Technical Specifications to specific standards and codes to be met by the works and materials to be executed or tested, the provisions of the latest current edition or revision of the relevant shall apply, unless otherwise expressly stated in the Contract.

Where appropriate, drawings, including site plans as required, may be furnished by the Procuring agency/Employer with the bidding documents. Similarly, the Contractor may be requested to provide drawings with its bid or for prior review by the Procuring agency/Employer during contract execution.

# **Drawings**

**Attached as Volume-IV**

## **Supplementary Information**

### **CONSTRUCTION CAMP AND HOUSING FACILITIES**

[The Bidder in accordance with Clause 6 of the Conditions of Contract shall provide description of his construction camp's facilities and staff housing requirements.

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

1. Site Preparation (clearing, land preparation, etc.).
2. Provision of Services.
  - a) Electrical power (expected power load, etc.).
  - b) Water (required amount and system proposed).
  - c) Sanitation (sewage disposal system, etc.)
3. Construction of Facilities
  - a) Contractor's Office. Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).
  - b) Warehouses and Storage Areas (area required, type of construction and layout).
  - c) Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction, etc.).
4. Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).
5. Other Items Proposed (Security services, etc.)
- 6.

**Note:**

The Contractor shall be responsible for pumps, electrical power, water and electrical distribution systems, and sewerage system including all fittings, pipes and other items necessary for servicing the Contractor's construction camp. The contractor is also responsible for clearance of site after completion of work.

# Bill of Quantities

**Attached as Volume-III**

**Note:** The tender will be dealt with separately in terms of technical and financial evaluation criteria and each lot will be awarded separately (independent of other) to the most advantageous bidder.

# Sample Bill of Quantities

## A. Preamble

1. The Bill of Quantities shall be read in conjunction with the Instructions to Bidders, General and Particular Conditions of Contract, Technical Specifications, and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work ordered and carried out, as measured by the Contractor and verified by the Engineer and valued at the rates and prices bid in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix within the terms of the Contract.
3. The rates and prices bid in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract, include all Constructional Plant, labour, supervision, materials, erection, maintenance, insurance, profit, taxes, and duties, together with all general risks, liabilities, and obligations set out or implied in the Contract.
4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of Items against which the Contractor has failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.
5. The whole cost of complying with the provisions of the Contract shall be included in the Items provided in the priced Bill of Quantities, and where no Items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related Items of Work.
6. General directions and descriptions of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering prices against each item in the priced Bill of Quantities.
7. Provisional Sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clauses 13.4 and 13.5 of the General Conditions.
8. The method of measurement of completed work for payment shall be in accordance with BOQ & Technical Specification

## Daywork Schedule

### *[Note to the Procuring agency/Employer:*

- (i) *A “Daywork Schedule” is commonly found in contracts where the likely incidence of unforeseen work cannot be covered by definitive descriptions and approximate quantities in the Bill of Quantities. The preferred alternative is to value the additional work in accordance with the Conditions of Contract. A Daywork Schedule normally has the disadvantage of not being competitive among bidders, who may therefore load the rates assigned to some or all the items. If a Daywork Schedule is to be included at all in the bidding documents, it is preferable to include nominal quantities against the items most likely to be used, and to carry the sum of the extended amounts forward into the Bid Summary in order to make the basic Schedule of Daywork Rates competitive.*
- (ii) *The total amount assigned to such competitive daywork is normally 3–5 percent of the estimated base Contract Price and is regarded as a Provisional Sum for contingencies to be expended under the direction and at the discretion of the Engineer.*

## General

1. Reference should be made to Sub-Clause 13.5 of the General Conditions. Work shall not be executed on a daywork basis except by written order of the Engineer. Bidders shall enter basic rates for daywork items in the Schedules, which rates shall apply to any quantity of daywork ordered by the Engineer. Nominal quantities have been indicated against each item of daywork, and the extended total for Daywork shall be carried forward as a Provisional Sum to the Summary Total Bid Amount. Unless otherwise adjusted, payments for daywork shall be subject to price adjustment in accordance with the provisions in the Conditions of Contract.

## Daywork Labour

2. In calculating payments due to the Contractor for the execution of daywork, the hours for labour will be reckoned from the time of arrival of the labour at the job site to execute the particular item of daywork to the time of return to the original place of departure, but excluding meal breaks and rest periods. Only the time of classes of labour directly doing work ordered by the Engineer and for which they are competent to perform will be measured. The time of gangers (charge hands) actually doing work with the gangs will also be measured but not the time of foremen or other supervisory personnel.
3. The Contractor shall be entitled to payment in respect of the total time that labour is employed on daywork, calculated at the basic rates entered by the Contractor in the **Schedule of Daywork Rates: 1. Labour**, together with an additional percentage payment on basic rates representing the Contractor’s profit, overheads, etc., as described below:

- (a) The basic rates for labour shall cover all direct costs to the Contractor, including (but not limited to) the amount of wages paid to such labour, transportation time, overtime, subsistence allowances, and any sums paid to or on behalf of such labour for social benefits in accordance with law of the land. The basic rates will be payable in PKR only.
- (b) The additional percentage payment to be quoted by the bidder and applied to costs incurred under (a) above shall be deemed to cover the Contractor's profit, overheads, superintendence, liabilities, and insurances and allowances to labour, timekeeping, and clerical and office work, the use of consumable stores, water, lighting, and power; the use and repair of stagings, scaffolding, workshops, and stores, portable power tools, manual plant, and tools; supervision by the Contractor's staff, foremen, and other supervisory personnel; and charges incidental to the foregoing. Payments under this item shall be made in the Pakistani Rupee:

**[Note to the Procuring agency/Employer:**

*This method of indicating profit and overheads separately facilitates the addition of further items of daywork, if needed, the basic costs of which can then be checked more easily. An alternative is to make Daywork rates all-inclusive of the Contractor's overhead and profit, etc., in which case this paragraph and the relevant Daywork Schedule should be modified accordingly.*

**Daywork Materials**

- 4. The Contractor shall be entitled to payment in respect of materials used for daywork (except for materials for which the cost is included in the percentage addition to labour costs as detailed heretofore), at the basic rates entered by the Contractor in the **Schedule of Daywork Rates: 2. Materials**, together with an additional percentage payment on the basic rates to cover overhead charges and profit, as follows:
  - (a) the basic rates for materials shall be calculated on the basis of the invoiced price, freight, insurance, handling expenses, damage, losses, etc., and shall provide for delivery to store for stockpiling at the Site. The basic rates shall be quoted in the currency specified in the BDS.
  - (b) the additional percentage payment shall also be made in the currency specified in BDS:
  - (c) the cost of hauling materials for use on work ordered to be carried out as daywork from the store or stockpile on the Site to the place where it is to be used will be paid in accordance with the terms for Labour and Construction in this schedule.

**Daywork Contractor's Equipment**

5. The Contractor shall be entitled to payments in respect of Contractor's Equipment already on Site and employed on daywork at the basic rental rates entered by the Contractor in the **Schedule of Daywork Rates, Contractor's Equipment**. Said rates shall be deemed to include due and complete allowance for depreciation, interest, indemnity, and insurance, repairs, maintenance, supplies, fuel, lubricants, and other consumables, and all overhead, profit, and administrative costs related to the use of such equipment.

*[Note to the Procuring agency/Employer: This is an example of wording to include overhead and profit, etc., in the daywork rates. A separate percentage addition could be used as for labour and materials.]* The cost of drivers, operators, and assistants will be paid for separately as described under the section on Daywork Labour. *An alternative, sometimes adopted for administrative convenience, is to include the cost of drivers, operators, and assistants in the basic rates for Contractor's Equipment. The last sentence of this paragraph 5 should then be modified accordingly.]*

6. In calculating the payment due to the Contractor for Contractor's Equipment employed on daywork, only the actual number of working hours will be eligible for payment, except that where applicable and agreed with the Engineer, the travelling time from the part of the Site where the Contractor's Equipment was located when ordered by the Engineer to be employed on daywork and the time for return journey thereto shall be included for payment.

- (a) The basic rental rates for Contractor's Equipment employed on daywork shall be stated in the currency specified in the BDS and the payment to the Contractor will be made in the currency specified in BDS.

### Schedule of Daywork Rates: 1. Labour

<i>Item no.</i>	<i>Description</i>	<i>Unit</i>	<i>Nominal quantity</i>	<i>Rate</i>	<i>Extended amount</i>
Subtotal					
D122	Allow ___ percent of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 3 (b) above.				
Total for Daywork: Labour (carried forward to Daywork Summary, p. ___)					_____

### Schedule of Daywork Rates: 2. Materials

<i>Item no.</i>	<i>Description</i>	<i>Unit</i>	<i>Nominal quantity</i>	<i>Rate</i>	<i>Extended amount</i>
Subtotal					
Allow ___ percent of Subtotal for Contractor's overhead, profit, etc., in accordance with paragraph 4 (b) above.					
Total for Daywork: Materials (carried forward to Daywork Summary, p. ___)					_____



## Daywork Summary

	<i>Amount</i> (       )
1. Total for Daywork: Labour	
2. Total for Daywork: Materials	
3. Total for Daywork: Contractor's Equipment	
Total for Daywork (Provisional Sum) (carried forward to Bid Summary, p. ____)	_____

## Summary of Specified Provisional Sums

<i>Bill no.</i>	<i>Item no.</i>	<i>Description</i>	<i>Amount</i>
1			
2			
3			
4			
		<i>[To be entered by the Procuring agency/Employer; Delete if not applicable:]</i> provisional sums for additional ES outcomes.	
etc.			
Total for Specified Provisional Sums (carried forward to Grand Summary (B), p. _ )			

## Grand Summary

Contract Name:

Contract No.:

<i>General Summary</i>	<i>Page</i>	<i>Amount</i>
Bill No. 1:		
Bill No. 2:		
Bill No. 3:		
—etc.—		
<i>Subtotal of Bills</i>	<i>(A)</i>	
<i>Total for Daywork (Provisional Sum)<sup>2</sup></i>	<i>(B)</i>	
<i>Specified Provisional Sums included in subtotal of bills</i>	<i>(C)</i>	<i>[sum]</i>
<i>Total of Bills Plus Provisional Sums (A + B + C)<sup>3</sup></i>	<i>(D)</i>	
<i>Add Provisional Sum for Contingency Allowance (if any)<sup>4</sup></i>	<i>(E)</i>	<i>[sum]</i>
<i>Bid Price (D + E) (Carried forward to Letter of Bid)</i>	<i>(F)</i>	

<sup>2</sup> For evaluation purposes, Provisional Sum, other than Daywork will be excluded

<sup>3</sup> All Provisional Sums are to be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clauses 13.4 and 13.5 of the General Conditions except with respect to DAAB Fees and Expenses for which Sub-Clause 13.4 of the Particular Conditions - Part B shall apply.

<sup>4</sup> To be entered by the Employer.

# **Technical Proposal**

- **Site Organization**
- **Method Statement**
- **Mobilization Schedule**
- **Construction Schedule**
- **Equipment**

## Site Organization

## **Method Statement**

## **Mobilization Schedule**

In accordance with the Particular Conditions, Sub-Clause 4.1, the Contractor shall not carry out mobilization to Site unless the Engineer gives consent.

## **Construction Schedule**

I.

### Form EQU: Equipment

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Section III, Evaluation and Qualification Criteria. A separate Form shall be prepared for each item of equipment listed, or for alternative equipment proposed by the Bidder.

Item of equipment		
Equipment information	Name of manufacturer	Model and power rating
	Capacity	Year of manufacture
Current status	Current location	
	Details of current commitments	
Source	Indicate source of the equipment <input type="checkbox"/> Owned <input type="checkbox"/> Rented <input type="checkbox"/> Leased <input type="checkbox"/> Specially manufactured	

Omit the following information for equipment owned by the Bidder.

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

## SECTION VI: STANDARD BIDDING FORMS

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The Base Date Prices and Current Date Prices of the specified elements shall be obtained from the sources specified in the contract. ....	Error! Bookmark not defined.
.....	

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

**RFB No.:** *[insert number of Bidding process]*

**Alternative No.:** *[insert identification No if this is a Bid for an alternative]*

**To:** *[insert complete name of Procuring agency/Employer]*

We, the undersigned Bidder, hereby submit the first part of our Bid, the Technical 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/Employer based on execution of a Bid Securing Declaration or Bid Securing Declaration in the Procuring agency/Employer’s country in accordance with **ITB 3**;
- (d) **Conformity:** We offer to execute works in conformity with the bidding document and in accordance with the works requirements: *[insert a brief description of the WORKS]*;
- (e) **Bid Validity Period:** Our Bid shall be valid for the period specified in **BDS 18.1** (as amended, if applicable) from the date fixed for the Bid submission deadline specified in **BDS 24.1** (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 20**;
- (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/Employer. 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 ];*
- (j) **Binding Contract:** We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed;
- (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]*

**Country of Origin of the Bidder:** *[insert country of origin, in case of JV country of origin of lead member]*

**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.

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

**Request for Bid No.:** *[insert number of bidding process]*

**Name of Project.:** *[insert identification]*

**Alternative No.:** *[insert identification No if this is a Bid for an alternative]*

**To:** *[insert complete name of Procuring agency/Employer]*

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 18.1** (as amended, if applicable) from the date fixed for the bid submission deadline specified in **BDS 24.1** (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 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) **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.”)

- (d) **Binding Contract:** We understand that this Bid, together with your written acceptance thereof included in your Letter of Acceptance, shall constitute a binding contract between us, until a formal contract is prepared and executed.

**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 ELI 1

## 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.]*

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

RFB No.: *[insert number of Bidding process]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

Page \_\_\_\_\_ of \_\_\_\_\_ pages

1. Bidder's Name <i>[insert Bidder's legal name]</i>
2. In case of JV, legal name of each member : <i>[insert legal name of each member in JV]</i>
3. Bidder's actual or intended country of registration: <i>[insert actual or intended country of registration]</i>
4. Bidder's year of registration: <i>[insert Bidder's year of registration]</i>
5. Bidder's Address in country of registration: <i>[insert Bidder's legal address in country of registration]</i>
6. 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>
7. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i> <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or documents of registration of the legal entity named above. <input type="checkbox"/> In case of JV, JV agreement, in accordance with ITB 3.3. <input type="checkbox"/> Establishing that the Bidder is not under the supervision of the Procuring agency/Employer[ in case of subsidiaries]
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

## ELI2

### Bidder's JV Members Information Form

#### NOT ALLOWED

*[The Bidder shall fill in this Form in accordance with the instructions indicated below. The following table shall be filled in for the Bidder and for each member of a Joint Venture]].*

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

RFB No.: *[insert number of RFB process]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

Page \_\_\_\_\_ of \_\_\_\_\_ pages

1. Bidder's Name: <i>[insert Bidder's legal name]</i>
2. Bidder's JV Member's name: <i>[insert JV's Member legal name]</i>
3. Bidder's JV Member's country of registration: <i>[insert JV's Member country of registration]</i>
4. Bidder's JV Member's year of registration: <i>[insert JV's Member year of registration]</i>
5. Bidder's JV Member's legal address in country of registration: <i>[insert JV's Member legal address in country of registration]</i>
6. Bidder's JV Member's authorized representative information Name: <i>[insert name of JV's Member authorized representative]</i> Address: <i>[insert address of JV's Member authorized representative]</i> Telephone/Fax numbers: <i>[insert telephone/fax numbers of JV's Member authorized representative]</i> Email Address: <i>[insert email address of JV's Member authorized representative]</i>
7. Attached are copies of original documents of <i>[check the box(es) of the attached original documents]</i> <input type="checkbox"/> Articles of Incorporation (or equivalent documents of constitution or association), and/or registration documents of the legal entity named above.
8. Included are the organizational chart, a list of Board of Directors, and the beneficial ownership.

# Personnel

## Form PER -1

### Contractor's Representative and Key Personnel Schedule

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

#### Contractor' Representative and Key Personnel

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

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

**Form PER-2:  
Resume and Declaration  
Contractor's Representative and Key Personnel**

<b>Name of Bidder</b>
-----------------------

<b>Position [#1]: [title of position from Form PER-1]</b>		
<b>Personnel information</b>	<b>Name:</b>	<b>Date of birth:</b>
	<b>Address:</b>	<b>E-mail:</b>
	<b>Professional qualifications:</b>	
	<b>Academic qualifications:</b>	
	<b>Language proficiency:</b> <i>[language and levels of speaking, reading and writing skills]</i>	
<b>details</b>	<b>Address of Procuring agency/Employer:</b>	
	<b>Telephone:</b>	<b>Contact (manager / personnel officer):</b>
	<b>Fax:</b>	
	<b>Job title:</b>	<b>Years with present Procuring agency/Employer:</b>

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

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

--	--	--	--

**Declaration**

I, the undersigned [ *insert either “Contractor’s Representative” or “Key Personnel” as applicable* ] , certify that to the best of my knowledge and belief, the information contained in this Form PER-2 correctly describes myself, my qualifications and my experience.

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

<b>Commitment</b>	<b>Details</b>
<b>Commitment to duration of contract:</b>	<i>[insert period (start and end dates) for which this Contractor’s Representative or Key Personnel is available to work on this contract]</i>
<b>Time commitment:</b>	<i>[insert period (start and end dates) for which this Contractor’s Representative or Key Personnel is available to work on this contract]</i>

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

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

**Name of Contractor’s Representative or Key Personnel:** *[insert name]*

Signature: \_\_\_\_\_

Date: (day month year): \_\_\_\_\_

**Countersignature of authorized representative of the Bidder:**

Signature: \_\_\_\_\_

**Date: (day month year):** \_\_\_\_\_

**Form CON – 2**

## Historical Contract Non-Performance, Pending Litigation and Litigation History

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member Name \_\_\_\_\_

ICB/NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Non-Performed Contracts in accordance with Qualification Criteria			
<input type="checkbox"/> Contract non-performance did not occur January [ <i>insert year</i> ]			
<input type="checkbox"/> Contract(s) not performed since [ <i>insert year</i> ]			
Year	Non-performed portion of contract	Contract Identification	Total Contract Amount (current value, currency, exchange rate and PKR equivalent)
		Contract Identification: Name of Procuring agency/Employer(PA): Address of PA: Reason(s) for nonperformance:	
Pending Litigation, in accordance with Qualification Criteria			
<input type="checkbox"/> No pending litigation			
<input type="checkbox"/> Pending litigation			

<b>Year of dispute</b>	<b>Amount in dispute (currency)</b>	<b>Contract Identification</b>	<b>Total Contract Amount</b>
		Contract Identification: _____ Name of PA: _____ Address of PA: _____ Matter in dispute: _____ Party who initiated the dispute: _____  Status of dispute: _____	
Litigation History in accordance with Section III, Evaluation and Qualification Criteria of the Prequalification document			
<input type="checkbox"/> No Litigation History <input type="checkbox"/> Litigation History			
<b>Year of award</b>	<b>Outcome as percentage of Net Worth</b>	<b>Contract Identification</b>	<b>Total Contract Amount (currency), PKR Equivalent (exchange rate)</b>
<i>[insert year]</i>	<i>[insert percentage]</i>	Contract Identification: <i>[indicate complete contract name, number, and any other identification]</i> Name of PA: <i>[insert full name]</i> Address of PA: <i>[insert street/city/country]</i> Matter in dispute: <i>[indicate main issues in dispute]</i> Party who initiated the dispute: <i>[indicate "Procuring agency/Employer" or "Contractor"]</i> Reason(s) for Litigation and award decision <i>[indicate main reason(s)]</i>	<i>[insert amount]</i>

# Financial Situation

Form FIN – 3.1:

## Financial Situation and Performance

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name \_\_\_\_\_

ICB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

### 1. Financial data

Type of Financial information in (currency)	Historic information for previous _____ years, _____				
	(amount in currency, currency, exchange rate*, PKR equivalent)				
	Year 1	Year 2	Year 3	Year4	Year 5
Statement of Financial Position (Information from Balance Sheet)					
Total Assets (TA)					
Total Liabilities (TL)					
Total Equity/Net Worth (NW)					
Current Assets (CA)					
Current Liabilities (CL)					
Working Capital (WC)					
Information from Income Statement					
Total Revenue (TR)					
Profits Before Taxes (PBT)					
Cash Flow Information					
Cash Flow from Operating Activities					

\*Refer to ITB 16 for the exchange rate

## 2. Sources of Finance

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

No.	Source of finance	Amount (PKR)
1		
2		
3		

## 2. Financial documents

The Bidder and its parties shall provide copies of financial statements for *5 years* pursuant to Evaluation and Qualifications Criteria, Sub-factor 3.1. The financial statements shall:

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

Attached are copies of financial statements for the 5 years required above; and complying with the requirements

**Form FIN – 3.2:**

**Average Annual Construction Turnover**

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name \_\_\_\_\_

ICB/NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

		Annual turnover data (construction only)	
Year	Amount Currency	Exchange rate	PKR equivalent
<i>[indicate year]</i>	<i>[insert amount and indicate currency]</i>		
Average Annual Construction Turnover *			

\* See Section III, Evaluation and Qualification Criteria.

**Form FIN – 3.3:**

**Financial Resources**

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

<b>Financial Resources</b>		
<b>No.</b>	<b>Source of financing</b>	<b>Amount</b>
1		
2		
3		

### Form FIN – 3.4:

#### Current Contract Commitments / Works in Progress

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

<b>Current Contract Commitments</b>					
<b>No.</b>	<b>Name of Contract</b>	<b>Procuring agency/Employer's Contact Address, Tel, Fax</b>	<b>Value of Outstanding Work [PKR Equivalent]</b>	<b>Estimated Completion Date</b>	<b>Average Monthly Invoicing Over Last Six Months [PKR/month]</b>
1					
2					
3					
4					
5					

**Form FIN - 5:**

**Self-Assessment Tool for Bidder’s Compliance to Financial Resources  
(Criterion 2.1 of Section 3)**

This form requires the same information submitted in Forms FIN – 3.3 and FIN -3.4. All conditions of “Available Financial Resources Net of CCC  $\geq$  Requirement for the Subject Contract” must be satisfied to qualify.

**Form FIN - 5A: For Single Entities**

For Single Entities: (A)	Total Available Financial Resources from FIN – 3.3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN – 3.4 (C)	Available Financial Resources Net of CCC $D = (B - C)$	Requirement for the Subject Contract (E)	Results: Yes or No [ <i>D must be greater than or equal to E</i> ] (F)
_____				.....	
(Name of Bidder)				..	

**Form FIN - 5B: For Joint Ventures ( NOT ALLOWED)**

For Joint Ventures: (A)	Total Available Financial Resources from FIN – 3.3 (B)	Total Monthly Financial Requirement for Current Contract Commitments (CCC) from FIN – 3.4 (C)	Available Financial Resources Net of CCC $D = (B - C)$	Requirement for the Subject Contract (E)	Results: Yes or No [ <i>D must be greater than or equal to E</i> ] (F)
One Partner:					
_____				.....	
(Name of Partner)				.	
Each Partner:					

_____				.....	
- (Name of Partner 1)				.	
_____				.....	
- (Name of Partner 2)				.	
_____				.....	
- (Name of Partner 3)				.	
All partners combined	$\sum D =$ Sum of available financial resources net of current contract commitments for all partners		$\sum D =$ _____	.....	.

**- Note -**

Form FIN – 5 is made available for use by the bidder as a self-assessment tool, and by the employer as an evaluation work sheet, to determine compliance with the financial resources requirement as stated in 2.3.3. Failure to submit Form FIN - 5 by the Bidder shall not lead to bid rejection.

**EXPERIENCE**

**Form EXP - 4.1**

**General Construction Experience**

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name \_\_\_\_\_

ICB/NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Starting Year	Ending Year	Contract Identification	Role of Bidder
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of PA: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of PA: _____ Address: _____	
		Contract name: _____ Brief Description of the Works performed by the Bidder: _____ Amount of contract: _____ Name of PA: _____ Address: _____	

**Form EXP - 4.2(a)**

**Specific Construction and Contract Management  
Experience**

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

JV Member's Name \_\_\_\_\_

ICB/NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

Similar Contract No.	Information			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub-contractor <input type="checkbox"/>
Total Contract Amount			PKR equivalent	
If member in a JV or sub-contractor, specify participation in total Contract amount				
PA's Name:				
Address:				
Telephone/fax number				
E-mail:				

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

<b>Similar Contract No.</b>	<b>Information</b>
Description of the similarity in accordance with Sub-Factor 4.2(a) of Section III:	
1. Amount	
2. Physical size of required works items	
3. Complexity	
4. Methods/Technology	
5. Construction rate for key activities	
6. Other Characteristics	

**Form EXP - 4.2(b)**

**Construction Experience in Key Activities**

Bidder's Name: \_\_\_\_\_

Date: \_\_\_\_\_

Bidder's JV Member Name: \_\_\_\_\_

Sub-contractor's Name<sup>5</sup> (as per ITB 34.2 and 34.3): \_\_\_\_\_

ICB/NCB No. and title: \_\_\_\_\_

Page \_\_\_\_\_ of \_\_\_\_\_ pages

All Sub-contractors for key activities must complete the information in this form as per ITB 38 and Qualification Criteria and Requirements, Sub-Factor 4.2.

1. Key Activity No One: \_\_\_\_\_

	<b>Information</b>			
Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Sub- contractor <input type="checkbox"/>
Total Contract Amount				PKR equivalent
Quantity (Volume, number or rate of production, as applicable) performed under the contract per year or part of the year	Total quantity in the contract (i)	Percentage participation (ii)		Actual Quantity Performed (i) x (ii)
Year 1				
Year 2				
Year 3				

<sup>5</sup> If applicable

	<b>Information</b>		
Year 4			
PA's Name:			
Address:			
Telephone/fax number			
E-mail:			

2. Activity No. Two

3. ....

	<b>Information</b>
Description of the key activities in accordance with Section III:	

**Form EXP - 4.2 (c)**

**Specific Experience in Managing ES aspects**

*[The following table shall be filled in for contracts performed by the Bidder, and each member of a Joint Venture]*

Bidder's Name: *[insert full name]*  
 Date: *[insert day, month, year]*  
 Joint Venture Member Name: *[insert full name]*  
 ICB/NCB No. and title: *[insert ICB/NCB number and title]*  
 Page *[insert page number]* of *[insert total number]* pages

1. Key Requirement no 1 in accordance with 4.2 (c): \_\_\_\_\_

Contract Identification				
Award date				
Completion date				
Role in Contract	Prime Contractor <input type="checkbox"/>	Member in JV <input type="checkbox"/>	Management Contractor <input type="checkbox"/>	Subcontractor <input type="checkbox"/>
Total Contract Amount			PKR	
Details of relevant experience				

2. Key Requirement no 2 in accordance with 4.2 (c): \_\_\_\_\_

3. Key Requirement no 3 in accordance with 4.2 (c): \_\_\_\_\_

4. ...

## **Appendix-A**

### **Form of Bid Security**

**(Bank Guarantee)**

*[The bank shall fill in this Bank Guarantee Form in accordance with the instructions indicated.]*

*[Guarantee on stamp paper amounting to Rs.5000/- ]*

**Beneficiary:** *[Purchaser to insert its name and address]*

**No.:** *[Purchaser to insert reference number for the Request for Bids]*

**Alternative No.:** *[Insert identification No if this is a Bid for an alternative]*

**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.***

## **Appendix-B**

### **Form of Bid-Securing Declaration**

*[The Bidder shall fill in this Form in accordance with the instructions indicated.]*

Date: *[date (as day, month and year)]*

No.: *[number of bidding process]*

Alternative No.: *[insert identification No if this is a Bid for an alternative]*

To: *[complete name of Procuring agency/Employer]*

We, the undersigned, declare that:

We understand that, according to your conditions, Bids must be supported by a Bid-Securing Declaration.

We accept that we will be blacklisted and henceforth cross debarred for participating in respective category of public procurement proceedings for a period of (not more than) six months, if fail to abide with a bid securing declaration, however without indulging in corrupt and fraudulent practices, if we are in breach of our obligation(s) under the Bid conditions, because we:

- (a) have withdrawn our Bid during the period of Bid validity specified in the Letter of Bid; or
- (b) having been notified of the acceptance of our Bid by the Procuring agency/Employer during the period of Bid validity, (i) fail or refuse to sign the Contract; or (ii) fail or refuse to furnish the Performance Security (or guarantee), if required, in accordance with the ITB.

We understand this Bid Securing Declaration shall expire if we are not the successful Bidder, upon the earlier of (i) our receipt of your notification to us of the name of the successful Bidder; or (ii) twenty-eight days after the expiration of our Bid.

Name of the Bidder\* \_\_\_\_\_

Name of the person duly authorized to sign the Bid on behalf of the Bidder\*\* \_\_\_\_\_

Title of the person signing the Bid \_\_\_\_\_

Signature of the person named above \_\_\_\_\_

Date signed \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_

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

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

*[Note: In case of a Joint Venture, the Bid-Securing Declaration must be in the name of all members to the Joint Venture that submits the Bid.]*

**APPENDIX-C**  
**FORMULA FOR PRICE ADJUSTMENT**

**NOT APPLICABLE**

## **Section VIII. General Conditions (GC)**

**Red Book:**

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The Conditions of Contract are the “General Conditions” which form part of the “Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer (“Red book”) Second edition 2017” published by the Federation Internationale Des Ingenieurs – Conseils (FIDIC) and the following “Particular Conditions” which shall complement the General Conditions of the Contract.

An original copy of the above FIDIC publication i.e. “*Conditions of Contract for Building and Engineering Works Designed by the Employer*” must be obtained from FIDIC.

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## **Section IX. Special Conditions of the Contract**

## Special Conditions of the Contract

The Special Conditions of Contract (SCC) complement the General Conditions of Contract (GCC) to specify data and contractual requirements of the Procuring agency/Employer/ Employer, the engineer, the sector, the overall project, and the works. In the event of a conflict, the provisions herein shall prevail over those in the GCC.

### Part A – Contract Data

Contract data of the SCC, includes data to complement the GCC in a manner similar to the way in which the Bid Data Sheet complements the Instructions to Bidders.

SCC Clause Number	GCC Clause Number	Amendments of, and Supplements to, Clauses in the GCC
<b>General Provision (GCC 1)</b>		
1.	1.3	<p><b>For notices</b></p> <p>Procuring agency/Employer/ Engineer’s Authorized representatives name and address:</p> <p><b><u>MANAGER/I/C REAL ESTATE State life Lahore</u></b></p>
2.	1.4	<p><b>Governing Law;</b></p> <p>The Applicable Law shall be: Laws of the <b><u>Islamic republic of Pakistan</u></b></p>
3.	1.4	<p><b>Communication Language:</b></p> <p>The Communication Language shall be: English</p>
4.	1.5	<p><b>Documents forming the contract listed:</b></p> <p>(1) The Contract Agreement (if completed);</p> <p>(2) The Letter of Acceptance;</p> <p>(3) The completed Form of Bid;</p> <p>(4) Special Stipulations (Appendix-A to Bid);</p> <p>(5) The Particular Conditions of Contract – Part II;</p> <p>(6) The General Conditions – Part I;</p> <p>(7) The priced Bill of Quantities (Appendix-D to Bid);</p> <p>(8) The completed Appendices to Bid (B, C, E to L);</p> <p>(9) The Drawings;</p>

		(10) The Specifications; and (11) In case of discrepancies between drawings, those of larger scale shall govern unless they are superseded by a drawing of later date regardless of scale. All Drawings and Specifications shall be interpreted in conformity with the Contract and these Conditions. Addendum, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.
<b>The Employer/ Procuring agency/Employer (GCC Clause 2)</b>		
5.	2.1	Time for access to the Site: within Fifteen days(15) of Commencement Date
<b>The Engineer (GCC Clause 3)</b>		
6.	3.2	The Engineer's Duties and Authority: Variations resulting in an increase of the Accepted Contract Amount in excess of 15% shall require approval of the Procuring agency/Employer. <b>Not acceptable</b>
<b>The Contractor (GCC Clause 4)</b>		
7.	4.2	Performance guarantee/security will be in the form of Bank Guarantee as a 10% percentage of the Contract Price
8.	4.7.2(a)	<b>Clause 4.7 Setting out</b> Period for notification of errors in the items of reference 30 days
9.	4.22	<b>Contractor's Operations on site</b> Site describe in detail if any other
<b>Sub-Contracting (GCC Clause 5)</b>		
10.	5.1(a)	Maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount) <b>Not acceptable</b>
11.	5.1 (b)	Works for which sub-contracting is not permitted. <b>Not Applicable</b>
<b>Staff and Labour (GCC Clause 6)</b>		
12.	6.5	Normal working hours: As per contractor require
<b>Plant, Material and Workmanship (GCC Clause 7)</b>		
13.	7.2	As mentioned in (Section V. Evaluation and Qualification Criteria)
<b>Commencement, Delays and Suspension (GCC Clause 8)</b>		
14.	8.3	Commencement date execution of the works: Within Seven days after

		signing of agreement
15.	8.8	Delay damages shall be payable for each day of delay shall be upto 0.25% of the Contract Price per day, in the currency and proportions in which the Contract Price is payable. Maximum amount of delay damages is 10% of the Contract Price
<b>Measurement and Valuation (GCC Clause 12)</b>		
16.	12.2	Method of measurement shall be as described in BOQs
17.	12.3	Percentage profit not applicable.
<b>Variations and Adjustments (GCC Clause 13)</b>		
18.	13.4 (b)(ii)	<i>NOT Applicable</i>
19.	13.7	
<b>Contract Price and Payment (GCC Clause 14)</b>		
20.	14.2	The Contractor shall be entitled to receive from the Employer Secured Advance against an indemnity bond acceptable to the Employer of such sum as the Engineer may consider proper in respect of non-perishable materials brought at the Site but not yet incorporated in the Permanent Works  <b>Not Applicable</b>
21.	14.2.3	Repayment of Advance payment:  <b>Not Applicable</b>
22.	14.3(iii)	Percentage of retention: 5% of the each IPC. Limit of Retention Money 10%.
23.	14.5(b)(i)	Not applicable.
24.	14.5(c)(i)	Not applicable.
25.	14.6.2	Withholding (amounts in) an IPC 05% of the Accepted Contract Amount.
26.	14.7(a)	Period of payment of Advance Payment to the Contractor 28 days. <b>Not Applicable</b>
27.	14.7b(i)	Period for the Procuring agency/Employer to make interim payments to the Contractor under Sub-Clause 14.11.1(c) (interim Payment) is 28 days from date of submission of IPC.
28.	14.7b(ii)	Not applicable.

29.	14.7(c)	Period for the Procuring agency/Employer to make final payment to the Contractor 56 days after submission of final Bill
30.	14.8	financing charges for delayed payment (percentage points above the average bank short-term lending rate as referred to under subparagraph (a) is <b>Nil</b>
31.	14.11.1(b)	Number of additional paper copies of draft Final Statement ( <b>03</b> )
32.	14.11.1(c)	Minimum amount/Billing Schedule of Interim Payment Certificates (IPCs) Bill#1 After completion of 25% work Bill#2 After completion of another 25% work Bill#3 After completion of another 25% work Bill#4 After completion of remaining work
<b>33.</b>	14.15	<b>Currencies of Payment</b> The Contract Price shall be paid in the currency or currencies named in the Contract Data.
34.	14.15 (a)(i)	Not applicable.
35.	14.15 (c)	Not applicable.
36.	14.15 (f)	Not applicable.
37.	17.2 (d)	<b>Liability for Care of the Works</b> Any operation of the forces of nature (other than those allocated to the Contractor in the Contract Data) which is Unforeseeable or against which an experienced contractor could not reasonably have been expected to have taken adequate preventative precautions.
<b>Insurance (GCC Clause 19)</b>		
38.	19.1	per occurrence with number of occurrences unlimited(Sole responsibility of Contractor). i) For property, full repair cost or full replacement cost as the case may be per occurrence with the number of occurrence unlimited. ii) In case of death , Pak Rs. 500,000/- per person iii) In case of major injury, Pak Rs. 100,000/- per person iv) In case of major injury, Pak Rs. 50,000/- per person The workmen compensation policy must contain following condition of indemnification per occurrence with the number of occurrence

		unlimited. v) In case of death , Pak Rs. 500,000/- per person vi) In case of major injury, Pak Rs. 100,000/- per person vii) In case of major injury, Pak Rs. 50,000/- per person
39.	19.2.1(b)	As mentioned in clause 19.1
40.	19.2.1(iv)	As mentioned in clause 19.1
41.	19.2.2	As mentioned in clause 19.1
42.	19.2.3(a)	As mentioned in clause 19.1
43.	19.2.3(b)	As mentioned in clause 19.1
44.	19.2.3	As mentioned in clause 19.1
45.	19.2.4	As mentioned in clause 19.1
46.	19.2.6	As mentioned in clause 19.1
<b>Dispute Avoidance/ Adjudication Board (GCC Clause 21)</b>		
47.	21.1	Time for appointment of DAAB <i>14 days</i>
48.	21.1	The DAAB shall comprise <i>5 members</i>
49.	21.1	List of proposed members of DAAB - Proposed by Employer/ Procuring agency/Employer 1. The Engineer In charge 2. Project Director - Proposed by Contractor 1. Authorized Professional Engineer 2. Member of Board of Director of Contractor Firm <b>ONE EXTERNAL MEMBER AGREED BY BOTH PARTIES NOT LESS (BPS-18 OR EQUIVALENT)</b>
50.	21.2	Appointing entity <b>MANAGER/I/C REAL ESTATE</b> for DAAB members

## **Part-B Special Provisions**

### **A) Testing to Material**

The Engineer-in-charge shall nominate the laboratory for all types of tests .samples carriage and test fee etc. shall be borne by the contractor.

**Table: Summary of Sections (if any)**

<b>Description of parts of the Works that shall be designated a Section for the purposes of the Contract (Sub-Clause 1.1.73)</b>	<b>Value: Percentage<sup>6</sup> of Accepted Contract Amount (Sub-Clause 14.9)</b>	<b>Time for Completion (Sub-Clause 1.1.84)</b>	<b>Delay Damages (Sub-Clause 8.8)</b>

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<sup>6</sup> These percentages shall also be applied to each half of the Retention Money under Sub-Clause 14.9

## **SECTION VIII: CONTRACT FORMS**



## Form of Contract

THIS AGREEMENT made the \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ between *[name and address of Procuring agency/Employer]* of Pakistan (hereinafter called “the Procuring agency/Employer”) of the one part and *[name of Contractor]* of *[city and country of Contractor]* (hereinafter called “the ”) of Contractor other part:

WHEREAS the Procuring agency/Employer desired that the works *[brief description of works]* should be executed by the contractor, and has accepted a Bid by the contractor for the execution and completion of these works and remedying of any defects therein, in the sum of *[contract price in words and figures]* (hereinafter called “the Contract Price”).

### **NOW THIS CONTRACT WITNESSETH AS FOLLOWS:**

1. In this Contract words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Contract, In the event of any ambiguity or conflict between the Contract Documents listed below, the order of precedence shall be the order in which the Contract Documents are listed below:-
  - (a) This form of Contract;
  - (b) Letter of Acceptance;
  - (c) the Form of Bid and the Price Schedule submitted by the Bidder;
  - (d) the Works Requirements;
  - (e) the Technical Specifications;
  - (f) the Drawings;
  - (g) the General Conditions of the Contract
  - (h) the Special Conditions of Contract,
  - (i) the completed schedule including Bill of Quantities; and
  - (j) *[add here: any other documents]*
3. In consideration of the payments to be made by the Procuring agency/Employer to the contractor as mentioned in this contract, the contractor hereby covenants with Procuring agency/Employer to execute the works to remedy defects therein in conformity in all respects with the provisions of the Contract.
4. The Procuring agency/Employer hereby covenants to pay the Contractor in consideration of the execution and completion of the Works and the remedying of defects therein, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS whereof the parties hereto have caused this Contract to be executed in accordance with their respective laws the day and year first above written.

<p>Signed, sealed, delivered by  the _____  (for the Procuring agency/Employer)</p>	<p>Signed, sealed, delivered by  the _____  (for the Contractor)</p>
<p>Witness to the signatures of the Procuring  agency/Employer  .....</p>	<p>Witness to the signatures of the Contractor  .....</p>

**Performance Guarantee Form**

To: *[name of Procuring agency/Employer]*

WHEREAS *[name of Contractor]* (hereinafter called “the contractor”) has undertaken, in pursuance of Contract No. *[reference number of the contract]* dated *[insert date]* for the execution of *[insert name of the works and its brief description]* (hereinafter called “the Contract”).

AND WHEREAS it has been stipulated by you in the said Contract that the contractor shall furnish you with a Bank Guarantee by a reputable bank for the sum specified therein as security for compliance with the Contractor’s performance obligations in accordance with the Contract.

AND WHEREAS we have agreed to give the Contractor a guarantee:

THEREFORE, WE hereby affirm that we are Guarantors and responsible to you, on behalf of the Contractor, 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 Contractor 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

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*[name of bank or financial institution]*

---

*[address]*

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*[date]*

## **Retention Money Security Demand Guarantee**

\_\_\_\_\_ [Guarantor letterhead or SWIFT identifier code]

**Beneficiary:** \_\_\_\_\_ [Insert name and Address of Procuring agency/Employer]

**Date:** \_\_\_\_\_ [Insert date of issue]

**RETENTION MONEY 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 Contractor, which in the case of a joint venture shall be the name of the joint venture] (hereinafter called "the Contractor") has entered into Contract No. \_\_\_\_\_ [insert reference number of the contract] dated \_\_\_\_\_ with the Procuring agency/Employer, for the execution of \_\_\_\_\_ [insert name of contract and brief description of Works] (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, the Procuring agency/Employer retains moneys up to the limit set forth in the Contract ("the Retention Money"), and that when the Taking-Over Certificate has been issued under the Contract and the first half of the Retention Money has been certified for payment, payment of [insert the second half of the Retention Money or if the amount guaranteed under the Performance Guarantee when the Taking-Over Certificate is issued is less than half of the Retention Money, the difference between half of the Retention Money and the amount guaranteed under the Performance Security and, if required, the ES Performance Security] is to be made against a Retention Money guarantee.

At the request of the Applicant, we, as Guarantor, hereby irrevocably undertake to pay the Beneficiary any sum or sums not exceeding in total an amount of \_\_\_\_\_ [insert amount in figures] (\_\_\_\_\_) [amount in words] upon receipt by us of the Procuring agency/Employer's complying demand supported by the Beneficiary's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating that the Applicant is in breach of its obligation(s) under the Contract, without your needing to prove or show grounds for your demand or the sum specified therein.

A demand under this guarantee may be presented as from the presentation to the Guarantor of a certificate from the Procuring agency/Employer's bank stating that the second half of the Retention Money as referred to above has been credited to the contractor on its account number \_\_\_\_\_ at \_\_\_\_\_ [insert name and address of Contractor's bank].

This guarantee shall expire no later than the .... day of ....., 2..., and any demand for payment under it must be received by us at the office indicated above on or before that date.

\_\_\_\_\_  
[signature(s)]

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

## 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: \_\_\_\_\_

Dated: \_\_\_\_\_

[Name of Contractor] 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 Contractor] 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 Contractor] 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 Contractor] 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 Contractor] 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

Contractor] 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.

\_\_\_\_\_  
[Procuring agency/Employer]

\_\_\_\_\_  
[Contractor]

# **VOLUME-II**

**TECHNICAL  
SPECIFICATIONS/PROVISIONS**

**“REHABILITATION OF COMMON AND  
WASHROOM AREAS ALONG WITH  
INSTALLATION OF LIFT AND ALLIED  
WORKS AT SLB, MULTAN”**

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## **SECTION-101 GENERAL**

### **1. LAYOUT**

The layout of various facilities / item of works under the scope shall be carried out accurately as per the plans and instructions of the Engineer. Before commencement of construction work, the layout shall be checked and certified by the Engineer. No separate measurement for payment shall be taken for this item of the work. The cost of the item shall be deemed to be included in other items of the work.

### **2. SOIL INFORMATION**

Any information on the properties of the soil that may be shown on the plans or obtained by the Contractor as a result of discussion with the Engineer or others shall be prejudice and shall not be considered as a valid basis for the Contractor's bid prices and subsequent execution and completion of works.

The Contractor shall visit the site prior to making his bid and shall ascertain the nature of the earth and rock, its quantity, locations, and suitability to meet the specified requirements, and he shall base his bid estimates solely on his own soil investigation. After the award of the contract no claim for a revision of bid prices depending on the sources of soil information will be entertained.

### **3. CLEARANCE OF SITE & LAYOUT OF BUILDINGS**

The work to be done under this section consists of dismantling and demolition of existing structure (if any) including clearing out site of all rubbish, grass, shrubs, brush wood, under growth, roots and trees. The scope of work shall include:

- Securing permanent benchmarks at given levels and grades wherever required.
- General grading and leveling of the site to achieve a proper drainage.
- Removing all construction or demolition debris after completion of the work to a distance of at least 100 meters from the outermost lines of the site or as required by the local authorities.
- All benchmarks' pegs, flags, pillars or any similar item and labour required for the setting out of the work shall be arranged by the Contractor. The cost of such item is to be included in the rate quoted by the Contractor in other items of work to be carried out under the Contract.

No tree shall be cut without the written orders. The wood obtained shall be neatly stacked and handed over to the Employer or his representative.

The ground shall be leveled and graded in accordance with the plans, sections or in the absence of such drawings as may be directed.

During demolition, the Contractor shall see that no damage or injury is done to the parts of the work which are to be retained, and that the demolition is executed with appropriate tools and in such a manner as to render unserviceable as little of the materials as possible.

Boards, battens, frames and woodwork, sheets, tiles, slates, trusses, R.S. beams and all such materials likely to be damaged if dropped from a height, shall be carried to the ground or lowered with ropes.

To minimize nuisance from dust, arrangements shall be made for the erection and removal of screens, canvas, or other suitable material and for watering the work as the demolition proceeds.

All dismantled materials shall be property of the Employer and shall be sorted and stacked where ordered. Doors and windows shall be removed from the chowkhats with their hinges before dismantling the later. The work of removing dismantled material up to 300 feet, sorting and stacking the same will be done within the rate.

As required, the Contractor shall remove the whole or a portion of dismantled material from the site of work. The method of disposal of such material shall be subject to approval.

The measurement for clearance of site and layout of buildings / external services shall not be made separately. The cost for clearance of site and layout of buildings shall be deemed to have been included in the rates of other items in the bill of quantities.

#### **4. APPROVAL OF MATERIALS**

The Contractor shall obtain prior approval of all material before procurement and its carriage to the site of works. The source of following materials is obligatory, and no alternative source will be acceptable to this effect:

- **Reinforcing Steel Bars:** The Contractor shall arrange testing of steel bars from an approved Laboratory prior to procurement and will be brought to the site of works when it conforms to the prescribed specifications.
- **Bricks:** local brick is not accepted. The Contractor shall submit samples from outside sources for consideration and approval by the Engineer.
- **Tiles-finishing Items,** The sample to this effect will be submitted for consideration and approval of the Engineer.

**SECTION - 201**

**EXCAVATION, FILLING,  
BACKFILLING & DISPOSAL**

**1. SCOPE OF WORK**

The work under this Section consists of excavating, in all types of soil, lifting, transportation and disposal of the excavated material, back-fill and fill for building foundations, and under floors including all incidental work necessary for excavation to the required depth and dimensions and in accordance with the Drawings or as directed. The work shall be carried out in complete conformity with the specifications set-forth hereunder.

All fill or refill around structures, i.e. within the slopes and limits of the established lines for excavation for the structures and below the natural surface level, shall be defined as "Back Filling".

All fill or refill (from the excavated earth at site) about structures, i.e. above the natural surface level shall be defined as "filling under floors or embankment from excavated spoil".

All fill or refill, from the material provided and brought from outside the site (any lead), about structures, i.e. above the natural surface level shall be defined as "filling under floors with earth provided and brought from outside".

Filling shall be approved selected material from excavated or other predominantly granular material, free from slurry and organic or other unsuitable matter and capable of compaction by ordinary means.

Filling around pipes and cables shall be carefully placed; fine material shall cover the pipe of cable completely before the normal filling is placed.

Material for back-filling shall conform to the requirements of Specifications. It shall be placed in layers of 6" and saturated with sufficient water or otherwise compacted to produce not less than 95 percent in situ density with respect to the maximum density at optimum moisture content, achieved in Test No. 12 of B.S. 1377-1967.

Filling shall not be placed against foundation walls without first obtaining approval to do so. Filling shall be brought up evenly on each side of the walls as far as practicable. Heavy equipment for spreading and compacting the fill shall not be operated closer to the wall than a distance equal to the height of the fill above the top of footing.

## **Setting Out**

Lines and levels shall be set out by the Contractor who shall be responsible for maintaining all stakes and witness points set up for the work in strict accordance with the requirement and drawings.

## **Cleaning**

All areas requiring clearing shall be cleared of all trees, bushes, rubbish and other objectionable matter and such materials shall be removed from the site of work or otherwise disposed off as approved. Any damage to the works of public or private property caused by Contractor's operation shall be made good through repair or replacement at the sole expenses of the Contractor.

## **2. AUTHORIZED OUTLINES**

Unless otherwise specified or directed in writing, all earthwork, i.e. excavation of trenches, pits, etc. for foundations, filling under floors, etc. shall be executed to the widths, depths, lengths, alignments grades and levels shown on the drawings. If they are not indicated on the drawings, then the Contractor shall prepare the drawing showing the existing ground levels and the actual grades and levels of excavation for obtaining necessary approval.

Similarly, for all backfill and fill works the Contractor shall prepare drawings showing the existing ground levels and the actual finished level to ascertain the volume of fill for obtaining approval before the commencement of work.

## **3. CONSTRUCTION REQUIREMENTS**

### **Excavation in Foundations & Backfilling**

#### **a. Lines and Grades**

The bottom and side slopes of excavation upon or against which structures or other required constructions are to be placed shall be finished accurately to the required grades and dimensions and, if required, shall be moistened with water and tamped or rolled with suitable tools or equipment for the purpose of forming firm foundation. Whenever the natural foundation material is disturbed or loosened or excavated beyond the approved lines and grades the loose material shall be removed and the extra excavation made good at Contractor's expense with selected materials which shall be thoroughly compacted by tamping rolling in layers not exceeding 6" (150 mm).

#### **b. Location for Placing Excavated/Surplus Materials**

The excavated/surplus earth shall not be heaped within 5 ft. (1.5 m) of the top edge of any foundation. The surplus material shall be disposed off within the site without any additional cost.

c. **Inspection of Foundations**

Foundation trenches shall be inspected and approved before foundation is laid. If safe foundation could not be obtained at the depth shown on the drawings or at maximum depth of five feet below the ground level, the work shall be carried out as directed. Additional Cost if any shall be paid in accordance with the provisions of the Conditions of Contract.

d. **Excavation to be kept Free of Water**

All excavations shall be kept free from water from whatever source it may come at all times except where otherwise specified or permitted in writing.

e. **Excess Excavation**

In the event of any excavation being carried out wider or deeper than shown on the drawings, it shall be filled in by the Contractor at his own expense to meet the required dimension and levels with concrete or any other material approved for such purpose.

f. **Planking and Strutting**

The Contractor shall provide at his own expense all timbering, piling, shoring, strutting and other approved supports to the sides of all excavation, trenches and all other works in such a way as will be sufficient to secure them from falling and to prevent any movement. The Contractor shall submit his proposals with drawings/sketches for approval prior to execution of any such construction work. All pecuniary and other responsibilities connected with this part of the work shall rest with the Contractor.

In removing timbering, shoring and strutting and all other supports from excavation and trenches etc., special care shall be taken to avoid bringing pressure to bear on any concrete or other work until it has hardened sufficiently to resist such pressure.

g. **Classification of Material**

No classification will be made for payment purposes of any material excavated as to its class, nature, origin, or condition, unless an unusual obstruction or embedded matter or substance is encountered. If this occurs, it shall be submitted by the Contractor for evaluation of design and working out of a necessary treatment. New items shall be mutually agreed.

h. **Transportation of Materials**

All carts, trucks or other vehicles used by the Contractor for transportation of the material shall be suitably constructed or lined out to permit any leakage of soil while the vehicles are on the move. These would be so loaded and arranged as not to spill on the site and public roads. Whenever any vehicle so used is found leaking and unsuitable it shall be immediately withdrawn from the work.

**i. Termite Control**

The approved foundation trenches shall be treated with the termite control solution as provided under section "Termite Control".

**j. Compacted Fill and Backfill**

It comprises returning, transportation and filling the selected excavated material around foundations, and at back of walls etc., up to finished levels shown on the drawings or as required in layers not exceeding 6 inches carefully rammed and consolidated (with addition of water if required) so as to achieve a minimum relative density of 90%. No filling shall be made until the concrete foundations and footings etc. have been inspected and approved. Earth to be used for filling must be free of all the organic impurities, debris or any other foreign matter. Earth which contains more than 1% of salts, particularly sulphates, will not be used in filling. In case of non-sufficiency of excavated material and unsuitability of earth for back-filling, appropriate material conforming to the Specifications requirements shall be brought by the Contractor. Necessary Laboratory tests shall be carried out at the Contractor's expense.

**4. EARTH FILLING UNDER FLOORS**

**Excavation of Works**

After the masonry has been laid up to the plinth level and the Damp Concrete Proof Course, if required is laid the space between the walls shall be cleared of debris and loose earth shall be laid in layers of 6" (150 mm) and each layer watered and compacted until the filling is completed up to the base level of the floor as shown on the drawings. Only sandy soil free from salt peter either from the materials excavated from the foundations if such materials is suitable and sufficient or suitable material brought from outside shall be used.

**5. SAND FILLING UNDER FLOOR**

Unless otherwise specified the base of all ground floors shall be constructed in accordance with the following specifications:-

Sand filling shall be done in layers not more than 4" (100 mm) thick and shall be rammed after saturation to such an extent that 4" (100 mm) layer is reduced to about 2.7" (68 mm) after compaction.

The required in situ density with respect to maximum density to optimum moisture content shall be in compliance with test 12 of B.S. 1377-1967.

The base shall be perfectly level. A slope of 1:64 shall be provided in verandahs and bathrooms if required.

Sand shall conform in all respect to the specifications for fine aggregate except for its grading, i.e. it shall pass through a sieve No. 16 and not more than 30% shall pass through a sieve No. 100.

## **6. MEASUREMENT AND PAYMENT**

### **6.1 Method of Measurement**

The measurement shall be made in cubic feet of earth acceptably excavated and backfilled for trenches and structures within the lines and grades shown on the drawing or as directed by the Engineer. The sand/earth filling will be measured in cubic foot of fill material duly compacted as required. The measurement of dewatering in trenches or structures shall be not be made and cost of this item shall be deemed included in the cost of excavation and backfilling.

### **6.2 Basis of Payment**

Payment for earth excavation and backfilling in trenches or structures will be made at unit price per cubic ft. stated in Bid Schedule of this contract or in applicable Variation Orders.

**SECTION - 202**  
**TERMITE CONTROL TREATMENT**

**1. SCOPE OF WORK**

The scope of work for anti termite treatment includes injection of insecticide in sides and bottom of foundation trenches, spraying on stockpiled backfill material and injections of the insecticide in floor sub-grade of the building. The scope also covers treatment of all wood works with insecticides before installation in position.

**2. MATERIAL**

2.1 An approved emulsible concentrate insecticide shall be used to dilution with water, specially formulated to prevent infestation by termites. Fuel oil will not be permitted as a diluent.

2.2 All mixing shall be done at site and mixing proportion of insecticide with water shall be in accordance with the approved manufactures recommendations and shall be verified by the Engineer.

2.3 Pure turpentine shall be used for dilution of insecticide, in approved proportion for application to woodwork.

**3. QUALITY ASSURANCE**

3.1 In addition to the requirements of these specifications, comply with manufacturer's instructions and recommendations for the work, including preparation of substrata and application.

3.2 A professional operator shall, be engaged who shall have license in accordance with regulations of governing authorities for application of soil treatment solution.

**4. EXTENT OF APPLICATION**

4.1 Contractor to ensure a continuity of treatment under and around the footings and up to the slab on grade in the form of an envelop.

4.2 Insecticide solution shall be applied with approved pressure spraying equipment maintaining a pressure of 150 psi to all applications to, on or in earth.

4.3 Soil treatment shall begin after all work of preparation of earth prior to installation of concrete has been done. After application, no additional earth moving or work upon sub grade should be done. No covering of earth or concrete should be applied over soil treatment until at least 24 hours after treatment has been made.

4.4 Insecticide solution should not be applied during wet weather, or when the earth surface is excessively wet. Application should be made to all areas beneath concrete slabs-on-grade, including sidewalks and paving abutting buildings for distance of at least 6 feet beyond building line. Rate of application of the solution shall be as per the recommendations of the manufacturer. Insecticide shall penetrate to a depth of 1 inch. (25 mm) minimum in porous earth at bottom and at least 50 mm at the sides of excavations.

4.5 Sides of foundation excavations, grade beam, and similar areas shall be treated with solution at a rate of 0.5 litre per square feet upon inner sides of such excavations, and at all locations where concrete slabs for platforms and similar work about the building. Similar treatment shall be made at all locations where expansion joints, control joints, column bases and similar work occur at or below grade slabs.

4.6 In the areas of application signs shall be fixed to show that soil treatment has been applied. Such signs shall be removed when areas are covered by other construction.

4.7 Care shall be exercised to ensure that no marks or damage occurs to the finished structure as a result of the work under this section.

4.8 All woodwork for the entire project is to be insecticide treated (before application of solignum). Insecticide shall be sprayed on all surfaces of all the wooden work viz., door frames, blocking, furring, planks, boards etc. before installation. Spraying is to be done at the site, after delivery and before installation. No spraying shall be necessary after field sawing, jointing or installation of such material.

## 5. **STANDARDS**

All methods of termite protection used herein shall be in accordance with the standard practices of National Pest Control Association, U.S.A and the British Wood Preserving Association.

## 6. **SAMPLES AND TESTS**

The Contractor shall supply samples of all the materials to be used for insecticide control for approval of the Engineer and testing in accordance with the specified standards. Rejected materials shall be removed from the site immediately.

## 7. **GUARANTEE**

The Contractor is to guarantee that the building shall be free from termites (white ants), wood bores and other pests, which cause damage to wood or other organic material for 7 years from the date of acceptance of the building.

In the event of any damage caused within the guaranteed period, the Contractor shall replace at his own cost such damaged material, finishes affected and suitably preserve and treat the entire premises with the best method known to the trade to prevent the spreading of termites

## **8. MEASUREMENT & PAYMENT**

### **8.1 Measurement**

The unit of measurement will be on per square foot basis of area to be termite proofed.

### **8.2 Payment**

The payment will be made on the basis of measurement made as above and at the unit rate quoted in the priced bill of quantities. The scope shall cover all material, equipment, labour and all incidentals to complete the item of the work as specified herein.

## **SECTION - 203 REINFORCEMENT**

### **1. SCOPE OF WORK**

The work under this section of specifications consists of furnishing, cuffing, fabricating, bending and placing steel reinforcement 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. APPLICABLE STANDARDS**

Latest editions of the following Pakistan, British and ASTM Standards are relevant to these specifications wherever applicable

#### **Pakistan Standard**

- PS 241 Tensile Testing of Steel.
- PS 244 Bend test for Steel
- PS 580 Rolled deformed Steel bars (intermediate grade) for concrete reinforcement.
- PS 605 Rolled deformed steel bars (hard grade) for concrete reinforcement.
- PS 606 Rolled deformed Steel bars (structural grade) for concrete reinforcement.
- PS 607 General technical delivery requirement for steel.

#### **British Standard**

- BS 693 General requirements for Oxy-acetylene welding of mild steel.
- BS 785 Hot rolled bars and hard drawn wire for the reinforcement of concrete.
- BS 1856 General requirement for the metal arc welding of mild steel.
- BS 4449 Hot rolled steel bars for reinforcement of concrete
- BS 4461 Cold worked steel bars for reinforcement of concrete.
- BS 4466 Bending dimensions and scheduling of bars for the reinforcement of concrete.

#### **ASTM Standard**

- A 305 Minimum requirement for the deformations of deformed steel bars for concrete reinforcement.
- A 615 Deformed billet steel bars for concrete reinforcement

#### **ACI Standard**

ACI 315 Manual of standard practice for detailing reinforced concrete structure.  
ACI 318 Building code requirements for reinforced concrete.

In addition to the above, the latest editions of other Pakistan Standards, British standards, American Concrete Institute Standards, American Society for Testing and Materials Standards and other standard as may be specified by the Engineer for Special Material and construction are also relevant.

### **3. MATERIAL AND SIZE OF BARS**

Reinforcement for concrete shall conform to the respective Pakistan, British, ASTM, or other Standards as specified in the Drawings and in the Contract Documents or as may be specified by the Engineer.

Unless otherwise specified, all plain reinforcing bars shall comply with the requirements of PS 4449 for plain mild steel bars and shall have a minimum characteristic strength of 40,000 psi.

Unless otherwise specified, all deformed reinforcing bars shall comply with the requirements of PS 4461 for deformed cold worked new stock billet steel bars and shall have a minimum characteristic strength of 60,000 psi.

Reinforcement of all types is to be stored on Site in an approved manner so as to avoid damage

Steel wire mesh reinforcement shall conform to requirements of ASTM Designation A- 18564 or BS 4483. Standard Specifications for Welded Steel Wire Fabric for concrete reinforcement. It shall be used where shown on the Drawings.

Reinforcement shall be free from all loose or flaky rust and mill scale, or coating, including ice, and any other substance that would reduce or destroy the tend. Reduced section steel reinforcement shall not be used.

### **4. DELIVERY & STORAGE**

#### **Delivery**

Steel reinforcement bars shall be kept in bundles firmly secured and tagged.

#### **Storage**

The method of storage shall be approved by the Engineer. Reinforcing bars shall be stored in racks or platforms above the surface of ground and shall be protected free from scaling, rusting, oiling, coatings, damage, contamination and structural defects prior to placement in works. Bars of different diameters and grades of steel reinforcement shall be kept separately.

### **5. BAR BENDING SCHEDULES**

The Contractor shall prepare bar bending schedules of all the reinforcing steel bars and these bar bending schedules shall be submitted to the Engineer for his approval. The Contractor shall obtain approval of the bar bending schedules before starting actual bar bending works.

#### **6. FABRICATING, BENDING & PLACING**

All metal for reinforcement shall be free from loose mill scale, loose rust, mud, oil, grease, or other harmful matter immediately before the concrete is placed.

Reinforcement is to be accurately placed as shown in the drawings, and secured against displacement by using 16 gauge G.I wire ties or suitable slips at intersections and supported from the formwork by using concrete, metal or plastic chairs and spacers or hangers of an approved pattern. Where concrete blocks are used for ensuring the cover, they shall be made of mortar not leaner than 1 part of cement to 2 parts of sand.

Where the concrete surface will be exposed to the weather in the finished structure, the portions of all accessories in contact with the form work shall be galvanized or shall be made of plastic.

Bars used for concrete reinforcement shall be fabricated in accordance with the dimensions shown in the bar bending schedule approved by the Engineer.

The cutting tolerance for all bars shall be  $\pm 1$  inch. ( $\pm 25$  mm).

Where an overall or an internal dimension of a bent bar is specified in the schedule, the bending tolerance, unless otherwise stated, shall be as in Table 1.

#### **Table 1: Bending Tolerances**

**Table 1: Bending Tolerances**

<u>Dimensions of bent bars</u>		<u>Tolerance</u>	
<u>Over Inches</u>	<u>Up to &amp; including Inches</u>	<u>Plus/Minus inches</u>	<u>inches</u>
-	40	1/4	1/4
40	80	1/4	3/8
80	-	1/4	1

Bars shall be placed to the following tolerances:

- Concrete cover to formed surfaces :  $\pm 1/4''$  ( $\pm 6\text{mm}$ )
- Minimum spacing between bars :  $\pm 1/4''$  ( $\pm 6\text{mm}$ )
- Top bars in slabs and beams
  - Members 8 inch deep or less :  $\pm 1/4''$  ( $\pm 6\text{mm}$ )
  - Members more than 8 inch but not over 24 inch deep :  $\pm 3/8''$  ( $\pm 10\text{mm}$ )
  - Members more than 24 inch deep:  $\pm 1''$  ( $\pm 25\text{mm}$ )
- Crosswise members : spaced evenly within: 2'' (50 mm)
- Lengthwise members :  $\pm 2''$  ( $\pm 50\text{mm}$ )

Bars may be moved as necessary to avoid interference with other reinforcing steel, conduits, or embedded items. If bars are moved more than one bar diameter or enough to exceed the above tolerances, the resulting arrangement of bars shall be subject to approval of Engineer.

Vertical bars in columns shall be offset at least one bar diameter at lapped splices. To ensure proper placement, templates shall be furnished for all column dowels.

Reinforcement shall not be bent or straightened in a manner that will injure the material.

No bars shall be bent twice in the same place, nor shall they be straightened after bending.

Unless permitted, by Engineer reinforcement shall not be bent after being partially embedded in hardened concrete.

No splice of reinforcement shall be made except as shown on the working drawings.

Welding shall be permitted for, bars only under suitable conditions and with suitable safeguards in accordance with BS 693, PS 1856, or AWS D12.1, provided the type of reinforcement bar has the required welding properties. Tack welding may be used to fix in position bars that cross each other, only with prior approval of the Engineer.

Exposed reinforcement intended for bonding with future extensions is to be effectively protected from corrosion Protection is also to be provided to reinforcement partly built into concrete where the exposed part is to be built into later concrete.

No concreting is to be carried out until the reinforcement has been checked and approved by the Engineer.

Welding shall be done as in section 'Structural Steel Works'

All detailing shall be done as per ACI standards ACI-315 and ACI-318.

7. Concrete clear cover for reinforcing steel shall be as follows:

<u>Structural Members</u>	<u>Minimum Cover, inch</u>
a. Concrete cast against and Permanently exposed to earth	3 inch (75 mm)
b. Concrete exposed to earth or weather: Bar Dia > 3/4" (20mm) Bar Dia < 5/6" (16mm)	2 inch. (50 mm) 1-5/6 inch. (40 mm)
c. Concrete not exposed To Weather or in contact with ground:	
Slabs, Walls	3/4 inch.
Beams, Columns: (Primary Reinforcement)	1-5/6 inch (40 mm)

All reinforcing steel shall be held firmly in place before and during the placing of concrete by means of wires and supports adequate to prevent displacement during the course of construction.

**9. MEASUREMENT & PAYMENT**

**9.1 Measurement**

The measurement of steel bars acceptably placed on the basis of the lengths of bars installed in accordance with the approved Drawings or bar schedules or as directed, converted to weight for the size of bars listed by the use of unit weights per linear foot as follows:

<u>Bar Size</u>	<u>Unit Weight lbs. per foot</u>
1/4"	0.167
3/8"	0.376
1/2"	0.668

5/8"	1.043
3/4"	1.502
7/8"	2.044
1"	2.670
1 1/8"	3.775
1 1/4"	4.172
1 3/8"	5.049

Steel in laps and embedment is indicated on the Drawings or as required by the Engineer will be paid for at the steel unit price. No measurement for payment will be made for the steel consumed in providing supports and for the additional steel in laps which are authorized for the convenience of the Contractor.

Measurement for steel reinforcement will be made of number of kgs/tons of steel accepted for measurement.

## **9.2 Payment**

The payment will be made on the basis of measurement made as above and at the unit rate quoted in the priced bill of quantities. The scope shall cover all material, equipment, labour and all incidentals to complete the item of the work as specified herein.

## **SECTION - 204**

### **PLAIN AND REINFORCED CONCRETE**

#### **1. SCOPE OF WORK**

The work under this section of the specification consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the supply, manufacturers, transporting, placing, consolidating and curing of plain & reinforced concrete and its constituents. Reinforcing steel does not form part of this section and is described in section '205'.

#### **2. GENERAL**

Trades like electrical, mechanical, plumbing etc. shall be well coordinated. Contractor shall take approval of coordinated shop drawings prior to concrete pouring.

Suitable templates or instructions or both shall be provided for setting out of items not placed in the forms. Embedded items and other materials for mechanical and electrical operations shall have been completed, inspected, tested and approved before concrete is placed.

For special concrete finish and for special methods of construction, formwork shop drawings shall be designed and prepared by the Contractor, at his own cost. Approval of shop drawings

as well as that of actual samples of concrete finish shall be obtained before work is commenced.

### 3. **APPLICABLE STANDARDS.**

Latest editions of the following Pakistan, British, ASTM, and ACI Standards are relevant to these specifications wherever applicable.

#### **Pakistan Standards**

PS 232 Portland cement (ordinary & rapid hardening)

PS 243 Natural aggregates for concrete

PS 279 Abrasion of coarse aggregates by the use of Los Angeles machine.

PS 280 Determination of aggregates crushing value.

PS 281 Organic impurities in sand for concrete aggregate

PS 282 Material finer than No. 200 PS test sieve in aggregates.

PS 283 Soundness test for aggregates by the use of sodium sulphate or magnesium sulphate.

PS 284 Sampling aggregates for concrete

PS 285 Sieve or screen analysis of fine and coarse

PS 286 Description and classification of mineral aggregates

PS 421 Sampling fresh concrete

PS 422 Slump test for concrete

PS 560 Making and curing concrete compression test specimen in the field.

PS 612 Sulphate-resistant Portland cement type 'A' and sampling fresh concrete in the laboratory.

PS 716 Mixing

PS 717 compacting factor test for concrete

PS 746 Definitions and terminology of cements

PS 849 Making and curing concrete compression test cubes.

**ASTM (American Society for Testing and Materials)**

- C 33 Concrete Aggregates.
- C 40 Organic impurities in sand for concrete.
- C 87 Effect of organic impurities in fine aggregates on strength of mortar.
- C 88 Soundness of aggregates.
- C 94 Ready mixed Concrete.
- C 109 Compressive strength of hydraulic cement mortars
- C 117 Material finer than No. 200 (0.075mm) sieve
- C 123 Light weight pieces in aggregates.
- C125 Concrete and concrete aggregates.
- C 127 Specific gravity and absorption of coarse aggregate.
- C 128 Specific gravity and absorption of fine aggregate.
- C 131 Resistance to abrasion of small size coarse aggregate.
- C 136 Sieve or screen analysis of fine and coarse aggregate.
- C 142 Clay lumps and friable particles in aggregates.
- C 143 Slump of Portland Cement Concrete
- C 150 Portland cement
- C 156 Water retention by concrete curing material
- C 171 Sheet material for curing concrete.
- C 185 Air content or hydraulic cement mortar.
- C 188 Density of hydraulic cement.
- C 191 Time of setting of hydraulic cement by vicat needle
- C 260 Air entraining admixture for concrete.

- C 289 Potential reactivity of aggregate.
- C 309 Liquid membrane forming compounds for curing concrete.
- C 494 Chemical admixtures for concrete.
- C 535 Resistance to abrasion of large size coarse aggregates.
- C75 Aggregate sampling.
- C 994 Preformed expansion joint filler for concrete.
- C 1190 Concrete joint sealer (hot poured elastic type).
- C 1715 Preformed expansion joint filler for concrete paving and structural concrete.
- D 1850 Concrete joint sealer (cold application type).
- E11 Wire cloth sleeves for testing purposes.
- E 96 Water vapour transmission of materials in sheet form.
- E 154 Materials for use as vapour barrier under concrete slabs.
- E 337 Relative humidity by wet and dry bulk psychrometer

**ACI (American Concrete Institute)**

- 211 Recommended practice for selecting proportions for normal and heavy weight concrete.
- 214 Quality control charts
- 301 Specifications for structural concrete for building.
- 304 Recommended practice for measuring, mixing, transporting and placing concrete.
- 305 Hot weather concreting.
- 308 Recommended practice for curing concrete.
- 309 Recommended practice for consolidation of concrete
- 315 Manual of standard practice of detailing reinforcement concrete structure.

318 Building code requirement of reinforced concrete.

347 Recommended practice for concrete formwork,

### **British Standards**

BS 12 Portland cement, ordinary and rapid hardening.

BS 410 Test Sieves

BS 812 Methods for the sampling and testing of mineral aggregates, sand fillers.

BS 822 Concrete aggregates from natural sources

BS 1881 Methods of testing concrete

BS 3148 Tests for water for making concrete

BS 3837 Expanded polystyrene boards

BS 3869 Rigid expanded polyvinyl chloride for thermal insulation.

Bs 4027 Sulphate – resisting Portland cement

CP 8110 Structural use of concrete

OP 114 Structural use of reinforced concrete in buildings

In addition, the latest editions of other Pakistan and British Standards, American Concrete Institute Standards, American Society for Testing and Materials Standards and other Standards as may be specified by the Engineer for special Materials and Construction are also relevant.

## **4. MATERIALS**

### **Aggregates**

Contractor shall run requisite physical and chemical tests of coarse and fine aggregates and submit to the Engineer for approval

**a.** The sources of supply of all fine and coarse aggregates shall be as specified or approved by the Engineer.

**b.** All fine and coarse aggregates shall be clean and free from clay, loam, silt and other deleterious matter. If required, the Engineer reserves the right to have them washed by the

Contractor at no additional expense. Coarse and fine aggregates shall be delivered and stored separately at site. Aggregates shall not be stored on muddy ground or where they are likely to become dirty or contaminated. They shall be placed on sloped hard strata to ensure well drained at all times.

c. Fine aggregate shall be hard coarse sand, crushed stone or gravel screenings and shall conform to requirements of PS 243 and/or BS 882 and or ASTM C-33. Only fine aggregate of grading zones 1 to 3 (BS882) shall be used.

d. Coarse aggregate shall be crush stone of hard, durable material free from laminated structure and conforming to PS 243 and/or PS 882 and/or ASTM C33, graded as follows for use in mass concrete as in foundations.

<u>Total Passing</u> <u>BS Sieve</u>	<u>Percent by weight</u>
76.20mm (3 inch)	100
38.10mm (1-1/2 inch)	95-100
19.05mm (3/4 inch)	30-70
9.52mm (3/8 inch)	10-35
4.76mm (3/16 inch)	0-5

Coarse aggregate for all cast-in-place concrete other than mass concrete as for foundations shall be graded with the following limits.

<u>BS Sieve</u>	<u>Total Passing</u>	<u>Percent by weight</u>
	38.10 mm (1½ inch)	100
	19.05 mm (3/4 inch)	95-100
	9.52 mm (3/8 inch)	25-55
	4.76 mm (3/16 inch)	0-10

e. Wherever feasible, the nominal maximum size of aggregate for cast-in place reinforced concrete slabs and other members shall be 3/4 inch. If there are difficulties in placing such a concrete the maximum size may be restricted to ½ inch. Provided the requirements for strength are satisfied, as approved by the Engineer.

f. Except where it can be shown to the satisfaction of the Engineer that a supply of properly graded aggregate of uniform quality can be maintained over the period of the work, the grading of the aggregates shall be controlled by obtaining the 3/4 inch maximum nominal size, the different sizes being stocked in separate stock piles and recombined in the correct proportion for each batch at the batching plant. The materials shall be stockpiled for a period before use so as to drain nearly to constant moisture content (as long as site and other conditions permit, preferably for at least a day). The grading of the coarse and fine aggregates shall be tested at least once for every 100 tons

supplied, to ensure that the grading is uniform and same as that of the samples used in the preliminary tests.

### **Cement**

- a. The cement shall be fresh and of approved origin and manufacture. It shall be one of the following as may be specified by the Engineer.

Ordinary or Rapid Hardening Portland cement complying with the requirements of P.S.232 or BS 12 or ASTM C-150

Sulphate Resisting Portland/Cement complying with the requirements of P.S.612 or BS 4027 or ASTM C-150.

- b. Unless otherwise specified. Ordinary Portland cement complying with the requirements of BS:12 shall be used.
- c. For all fair faced concrete it will be necessary to use approved cement with a view to obtain a light shade concrete as approved by the Engineer.
- d. The Contractor shall supply to the Engineer at fortnightly intervals, test certificates with the appropriate standard in respect of the samples of cement from the work site. These tests shall be carried out in a laboratory approved by the Engineer.
- e. Only one brand of each type of cement shall be used for concrete in any individual member of the structure. Cement shall be used in the sequence of receipt of shipment, unless otherwise directed.
- f. There shall be sufficient cement at site to ensure that each section of work is completed without interruption. If the cement is supplied by the Employer, the Contractor should inform the Employer, of his requirements sufficiently in advance of its use in construction.
- g. Cement reclaimed from cleaning of bags or from leaky containers shall not be used.
- h. The contractor shall provide and erect (at his cost) a suitable plain, dry, well ventilated, weatherproof and water proof shed of sufficient capacity to store the cement.
- i. The cement shall be used as soon as possible after delivery and cement which the Engineer considers has become stale or unsuitable through absorption of moisture from the atmosphere or otherwise "shall be rejected and removed immediately from the site at the Contractor's expense. Any cement in containers damaged so as to allow the contents to spill or permitting access of the atmosphere prior to opening of the container at the time of concrete mixing shall be rejected and removed immediately from the site at the Contractor's expense.
- j. The mixing together of different types of cement will not be permitted

### **Water**

Water shall be tested in accordance with PS 3148 and shall be used only from an approved source.

The Contractor shall supply sufficient water for all purposes, including mixing the concrete, curing and cleaning plant and tools. Where water can be shown to contain any sugar or an excess of acid, alkali or salt, the Engineer may refuse to permit its use.

### **Additive**

All additives such as foaming, and water proofing agents shall be from a manufacturer approved by the Engineer.

Air Entraining Admixtures conforming to ASTM C-260, and other Admixtures conforming to ASTM C-494 shall be used subject to approval of the Engineer.

## **5. NOMINAL CONCRETE MIXES**

### **Proportions of Mix**

#### **a. Cement and aggregates:**

The cement, fine aggregate and the coarse aggregate shall be weighed separately. The proportions of cement to fine aggregate and coarse aggregate shall be adjusted to provide the concrete of the required crushing strength when tested as set out in Table 1.

- b. The Contractor shall prepare mix design of various grades of concrete for the approval or Engineer prior to starting concrete works. He shall regulate and arrange mixing of the ingredients of the concrete by weigh batching. The cost of designing the mix shall be borne by the Contractor.

#### **c. Water Cement Ratio:**

The quantity of water used shall be just sufficient to produce a dense concrete of adequate strength and workability for its purpose. For all external work and foundations the water/cement ratio should not exceed 0.55.

#### **d. Workability:**

The workability shall be controlled by direct measurement of the water content, allowance being made for any water in the fine and coarse aggregates. The concrete shall be sufficiently workable to be placed and compacted, without difficulty, by the available means.

Workability shall be determined by either the slump or compaction factor tests as directed by the Engineer and these shall be performed in accordance with the methods given in PS 422 and P.S. 177 or ASTM C-143. The slump or compaction factor for each class of concrete shall be determined during the preliminary test mixes and the value obtained shall not be modified without the written consent of the Engineer. Unless otherwise permitted or specified, the concrete shall be proportioned and produced to have a slump of 3 inch or less if consolidation is to be by vibration. A tolerance of up to 1 inch above the indicated maximum shall be allowed for individual batches provided the average for all batches or the most recent 10 batches tested, which ever is fewer, does not exceed the maximum limit. Concrete of lower than usual slump may be used provided it is properly placed and consolidated.

**Strength requirements for concrete**

- a. Concrete made with Portland cement shall comply with the strength requirements of Table 1 (Works Test).

Table: Strength requirements for Portland cement concrete with aggregate complying with BS 882.

<b>Class of concrete (psi)</b>	<b>Cylinder strength at 28 days (psi)</b>	<b>Cube strength at 28 days (psi)</b>
A	4000	5000
B	3000	4000
C	2000	3000
D	1000	2000
E	800	1200

- b. All structural concrete shall conform to BS 5328-81.
- c. Unless otherwise stated, the types of concrete shall be classified on the basis of compressive strength requirements.
- d. The Contractor shall provide Mix Design by weight for each class of concrete. Manufacture 12 Nos. test cubes 6" x 6" x 6" in accordance with the Mix design batching by weight and test 3 cubes each at 3,7,14 & 28 days intervals in the presence of Engineer's Representative and submit all relevant data and results of tests for approval of the Engineer. The Contractor shall obtain approval from the Engineer in writing for each Mix design before producing the actual concrete for the Works.

No payments for producing the Mix design, manufacture of test cubes and testing shall be made. The Contractor shall include this cost in the relevant item of concrete.

**Batching**

- a. All cement, including cement supplied in bulk, shall be batched by weight. A bag of cement may be taken as 110 lbs. with the prior approval of the Engineer.
- b. Aggregates shall be batched by weight, due allowance being made for moisture content. The apparatus for weigh-batching may be an integral part of the mixer or a separate unit of a type approved by the Engineer. It shall be accurate within 2% and shall be checked for accuracy at least once a month.
- c. The quantity of additives i.e. foaming and water proofing agents etc. shall be as prescribed by the manufacturer or as directed by the Engineer.
- d. Where the batching plant is of the type in which cement and aggregates are weighed in the same compartment, the cement shall be introduced into the compartment between two sizes of aggregates.
- e. Each batch shall be so charged into the mixer that some water will enter in advance of the cement and aggregates. Water shall continue to flow for a period which may extend to the end of the first 25 percent of the specified mixing time. Controls shall be provided to prevent batched ingredients from entering the mixer before the previous batch has been completely discharged.

### **Mixing**

The concrete shall be mixed in an approved batch mixer conforming to the requirements of BS 305. It shall be fitted with the manufacturer's plate stating the rates, capacity and the recommended number of revolutions per minute and shall be operated in accordance therewith. It shall be equipped with a suitable charging mechanism and an accurate water measuring device.

- a. Mixing shall continue for the period recommended by the mixer manufacturer or until there is apparently a uniform distribution of the materials and the mass is uniform in colour, whichever period is longer. If it is desired to use a mixing period of less than 1½ minute, the Engineer's approval shall be obtained in writing.
- b. Controls shall be provided to ensure that the batch cannot be discharged until the required mixing time has elapsed. At least three quarters of the required mixing time shall take place after the last of the mixing water has been added.
- c. The interior of the mixer shall be free of accumulations that will interfere with mixing action. Mixing blades shall be replaced when they have lost 10 percent of their original height.
- d. Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be retempered but shall be discarded.

### **Transporting**

- a. The concrete shall be transported from the place of mixing to the place of final deposit as rapidly as practicable by means which will prevent segregation or loss of or addition to ingredients it shall be deposited as nearly as practicable in its final position so as to avoid rehandling or flowing. All skips vehicles, or containers used for transporting the concrete shall be thoroughly clean.
- b. During hot or cold weather, concrete shall be transported in deep containers, on account of their lower ratios of surface area to mass, which reduces the rate of loss of water by evaporation during hot weather and loss of heat during cold weather.

### **Placing**

- a. Before placing of concrete, formwork shall have been completed, water shall have been removed reinforcement shall have been secured in place; expansion joint material, and other embedded items shall have been kept in position; and the entire preparation shall have been approved.

No concrete is to be placed into the foundation trenches until the ground to receive the same has been examined and approved by the Engineer for this purpose.

- b. Concrete shall be deposited continuously, or in layer of such thickness that no concrete will be deposited on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, construction joints shall be located as shown in the Contract Documents or as approved by the Engineer. Placing shall be carried out at such a rate that the concrete which is being integrated with fresh concrete is still plastic. Concrete which has partially hardened shall not be deposited Temporary spreaders in forms shall be removed when the concrete placing has reached an elevation rendering their services unnecessary They may remain embedded in the concrete only if made of metal or concrete and if prior approval has been obtained.
- c. The actual sequence of construction proposed by the Contractor shall be subject to the Engineer's approval before construction starts on any part of the structure, and this sequence shall not be varied without the Engineer's approval.
- d. The concrete shall be placed as soon after it has been mixed as is practicable. Once the concrete has left the mixer, no more water shall be added, although the concrete may be mixed or agitated to help maintain workability. The concrete shall not be used if, through any cause, the workability of the mix at the time of placing too low for it to be compacted fully and to an acceptable finish by whatever means available.

The time between mixing and placing should be reduced if the mix is richer or the initial workability of the mix is lower than normal; if a rapid hardening cement or an accelerator is used, or if the work is carried out at a high temperature or exposed to a drying atmosphere.

The Contractor shall ensure that the delay between mixing and placing does not exceed 45 minutes under any circumstances. Any concrete which does not satisfy this requirement shall not be used.

- e. The concrete shall be deposited as nearly as possible in its final position to avoid rehandling. In no circumstances may concrete be railed or made to flow along the forms by the use of vibrators. Concreting shall be carried on as a continuous operation using methods which shall prevent segregation or loss of ingredients.
- f. The free fall of concrete shall not be allowed to exceed 5 ft. (1.5 m) and where it is necessary for the concrete to be lowered more than this depth, it is not to be dropped into its final position, but shall be placed through pipes fed by a hopper. When a pipe is used for placing concrete the lower end shall be kept inside, or close to the freshly deposited concrete. The size of the pipe shall be not less than 9 inches (225mm) diameter.
- g. The workmen carrying concrete to the site, and all other workmen moving about on the reinforcement before the concrete is placed, shall move only along runways or planks placed for the purpose and no person shall be allowed to walk on the reinforcement itself.
- h. Prior to the laying of concrete on load bearing masonry walls, bearing plates and at other points, as may be directed by the Engineer, the surface will be brought to a true, hard, smooth, level surface using cement sand mortar in the ratio of 1 part of cement to 3 parts of sand. Two layers of building paper will then be laid flat to separate the concrete from the surface on which it is to be laid.

#### **Construction Joints**

- a. Concreting shall be carried out continuously up to construction joints, the arrangement of which shall be predetermined by the Engineer.
- b. Joints not shown on the drawings shall be so made and located as to least impair the strength of the structure and shall need prior approval of the Engineer. In general, they shall be located near the middle of the spans of slabs and beams unless a secondary beam intersects a main beam at this point, in which case the joint in the main beam shall be offset a distance equal to twice the width of the secondary beam. Joints in walls and columns shall not be at the underside of floor slabs or beams, and at the top of footings or floor slabs. Beams, brackets, columns, capital haunches and drop panels shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.
- c. All reinforcing steel shall be continued across joints. Key and inclined dowels shall be provided as directed by the Engineer. Longitudinal keys at least 1½ inch. (40 mm) deep shall be provided in all joints in walls and between walls and slabs or footings.
- d. When the work has to be resumed on a surface which has hardened, such surface shall be roughened in an approved manner which will expose the aggregate uniformly

and will not leave laitance, loosened particles of aggregate or damaged concrete at the surface. Feather edges will be avoided.

- e. The hardened concrete of construction joints and of joints between footings and walls or columns, between walls or columns and beams or floors they support, joints in unexposed walls and all others not mentioned herein shall be dampened (but not saturated) immediately prior to placing of fresh concrete.
- f. The hardened concrete of joints in exposed work, joints in the middle of beams and slabs; and joints in work designed to contain liquids shall be dampened (but not saturated) and then thoroughly covered with a coat of cement grout similar in proportions to the mortar in the concrete. The grout shall be as thick as possible on vertical surfaces and at least 150 mm thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained initial set.
- g. Where the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristles and brushed, care being taken to avoid dislodgment of particles of aggregate. The surface shall then be coated with neat cement grout. The first layer of concrete to be placed on this surface shall not exceed 6 inches (150 mm) in thickness, and shall be well rammed against old work, particular attention being paid to corners and closed spots.

#### **Expansion Joints.**

Expansion joints shall be provided wherever indicated on the Drawings. In no case shall the reinforcement, corner protection angles, or other embedded items be run continuous or through an expansion joint. All expansion joints shall be carefully placed so as not to be displaced during concreting. The method of placing the expansion joints shall be strictly in accordance with the Drawings and as approved by the Engineer. All materials for use in the expansion joints shall have, prior approval of the Engineer before placing order for supply.

#### **Embedded Items**

- a. The material, design and location of water stops in joints shall be as indicated in the Contract Documents. Each piece of remolded water stop shall be of maximum practicable length in order that the number of end joints will be held to a minimum
- b. Joints at intersections and at ends of pieces shall be made in the manner most appropriate to the material being used. Joints shall develop effective watertightness fully equal to that of the continuous water stop material, shall permanently develop not less than 50 percent of the mechanical strength of the parent section, and shall permanently retain their flexibility
- c. Electric conduits and other pipes which are planned to be embedded shall not, with their fittings, displace more than four percent of the area of the cross section of a column on

which stress is calculated or which is required for fire protection. Sleeves, conduits, or other pipes passing through floors, walls, or beams shall be of such size or in such location as not to impair unduly the strength of the construction; such sleeves, conduits, or pipes may be considered as replacing structurally in compression the displaced concrete, provided that they are not exposed to rusting or other deterioration, are of uncoated or galvanized iron or steel not thinner than standard steel pipe, have a nominal inside diameter not over 50 mm and are spaced not less than three diameters on centres except when plans of conduits and pipes are approved by the Engineer embedded pipes and conduits other than those merely passing through, shall not be larger in outside diameter than one third the thickness of the slab, wall, or beams in which they are embedded nor so located as to 'impair unduly the strength of the construction. Sleeve pipes, or conduits of any material not harmful to concrete and within the limitations of this section may be embedded in concrete with the approval of the Engineer provided they are not considered to replace the displaced concrete.

- d. All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.
- e. All Contractors whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.
- f. Expansion joint material, water stops and other embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with readily removable material to prevent the entry of concrete into the voids.

### **Precast Concrete**

Precast concrete units shall be fair faced, cast to the sizes and dimensions as indicated on the Drawings. The concrete used for precast units shall conform to the specifications laid down for cast in situ reinforced cement concrete unless otherwise required and directed by the Engineer.

The Contractor shall be required to submit a sample of precast unit for the approval of the Engineer all pre cast units shall strictly conform to the approved sample.

Precasting platform of the size and at the location approved by the Engineer shall be constructed. The concrete in one pre-cast unit shall be placed in one operation, in accordance with the details shown on the Drawings.

The material and design of formwork and the method of pre-casting the units shall be approved by the Engineer.

The erection/installation and removal of the precast units from the precasting platform shall not be permitted until and unless they are properly cured to the satisfaction of the Engineer.

All precast units shall be smoothly finished to the required lines, grades, angles etc. Holes, grooves, pockets, hooks shall be provided as shown and/or as directed by the Engineer. The units shall be properly stacked on a platform without causing any cracks and damages. Curing of all the precast units shall be done in accordance with the relevant BSS/approval of the Engineer.

a. **Erecting Precast Units**

All the precast units shall be transported and erected into position in a manner as approved by the Engineer.

The Contractor shall submit his proposal in this regard and obtain approval from the Engineer in advance.

The units shall be embedded or otherwise installed in their permanent positions as shown on the Drawings or as directed by the Engineer.

b. **Lifting Beams**

The Contractor shall use lifting beams at his own cost, for erecting pre-cast members where the Engineer so directs. Lifting beams shall be supplied and erected by the Contractor, at his own cost, at all points where lifting is necessary for maintaining the plant but is inaccessible to mobile cranes or alternatively, covered by overhead traveling cranes. The Contractor, however, is to supply the trolleys and erect them on the lifting beams, and to test operation of installed equipment.

**Cement Concrete Pavements**

For all concrete work relevant specifications of this section shall apply

a. **Side Forms and Construction**

Side forms shall be of steel or any other suitable material and of a design as approved by the Engineer.

In general, only materials and methods that have proved their acceptability by past performance will be considered. All form shall be constructed so that they can be removed without hammering or prying against the concrete.

Horizontal joints in the forms will not be permitted. Forms shall be thoroughly cleaned and oiled with linseed/mineral oil or shall be given two coats of nitro- cellulose lacquer each time they are used.

The forms shall be set on a thoroughly compacted base true to line and level and firmly secured in position by appropriate methods. Conformity with the alignment and levels shown on the Drawings shall be checked as and when required by the Engineer. Where

necessary corrections shall be made immediately before placing the concrete; where any form has been disturbed it shall be reset and rechecked.

Pavements shall be constructed in panels of sizes as shown on the Drawings. The panels shall be laid alternately, the adjoining panels being concreted when the side forms are struck and the jointing materials placed, inspected and approved by the Engineer. Each panel is to be concreted in one operation and no interruptions shall be permitted during the operation. The concrete shall be tipped from the trolley slightly in advance of the working place and then shoveled into position. The spreading shall be carried out very carefully. Compaction shall be done by means of vibro compactors or approved surface vibrators. If a vibro compactor is used, it shall be operated on the concrete and will not be allowed to strike or displace the forms. The spreading and compacting of the successive layers shall proceed without interruptions and as quickly as practicable so as to ensure that the slab is monolithic throughout its depth.

The wearing surface shall be laid while the base concrete is still wet and screeded to line and level. When the initial set takes place the surface shall be troweled smooth with a steel trowel to provide a dense closed surface.

All the joints shall be carefully formed as shown on the Drawings or as directed by the Engineer. The joint filler together with preformed groove shall provide complete separation of adjacent slabs. The joints shall all be sealed with bitumen as shown on the Drawings or/and as directed by the Engineer.

#### **b. Protection and Curing**

##### **General Requirements**

Concrete shall be protected adequately from injurious action sun, rain, flowing water and mechanical injury, and shall not be allowed to dry from the time it is placed until the expiry of the minimum curing periods specified hereinafter. Water curing shall be accomplished by keeping the surface of the concrete continuously wet by covering with water or with approved water saturated covering, where wood forms are left in place for curing.

They shall be kept sufficiently damp at all times to prevent openings at the joints and drying out of the concrete. All portions of the structure shall be kept moist for the full curing periods, specified hereinafter.

When liquid membrane curing compound is used the surface of the concrete shall be protected from traffic or other abrasive action that may break the membrane, for the full period of curing. The membrane curing compound shall be white colored and shall be approved by the Engineer and shall comply with ASTM Designation C 309, type 2.

##### **Curing Periods:**

The curing period shall be at least 10 days, or as directed by the Engineer

### **Removal of Forms.**

The Contractor shall exercise great care in avoiding damage to joints, arises, dowel bars etc. while removing the forms. Under no circumstances will the use of pry bars between the forms and pavement be permitted. Side forms shall not be removed until at least 40 hours have elapsed from the time of completing the concreting of the slab which they contain. In no case shall forms be removed until the concrete has hardened sufficiently to permit removal without damage to the concrete. Concrete work shall be protected from damage during the removal of formwork and from injury resulting from the storage or movement of material during construction.

#### **c. Finishing**

All unformed surfaces shall be finished with a wood float except as otherwise specified. Visible vertical surfaces shall have all projections and irregularities removed. The entire surface shall be rubbed if required by the Engineer, with a No. 16 carborundum brick, or other abrasive until even, smooth and of uniform appearance, and shall be washed clean. Plastering of surface, application of cement or other coating will not be permitted.

All exposed corners shall be chamfered, 1 inch x 1 inch (25x25mm) unless otherwise mentioned or shown in the plans or directed by the Engineer. Concrete surface which will be covered with other materials shall be screeded without floating.

#### **d. Spreading. Finishing and floating of concrete in pavements:**

##### **General Requirements:**

The striking off, compacting and floating of concrete shall be done by mechanical methods, if approved by the Engineer. Where the Engineer determines that it is impracticable to use mechanical methods, manual methods of spreading, finishing and floating may be used on pavement lines as indicated on the Drawings.

##### **Mechanical Methods**

The concrete shall be spread uniformly between the forms, immediately after it is placed, by means of an approved spreading machine. The spreader shall be followed by an approved finishing machine equipped with two oscillating or reciprocating screeds. The spreading machine or the finishing machine shall be equipped with vibrating equipment that will vibrate the concrete for the full paving width. Internal vibrators shall be used adjacent to the longitudinal edge of the pavement. These vibrators shall be attached to the rear of the spreading machine onto the finishing machine. Vibrators shall not rest on new pavements or side forms or in contact with any dowel bars, and the arrangement of power supply to the vibrators shall be such that when the motion of machine is stopped, vibration shall cease. The rate of vibration shall be not less than 8000 vibrations per minute. The concrete shall be spread to full width before being struck off and compacted so that the surface will conform to the finished grade and crosssection as shown on the plans and at the same time leave sufficient material for the floating operation. The

spreading & finishing machine shall move over the pavement as many times and at such intervals as may be required by the Engineer to ensure thorough compaction.

Except as otherwise specified, after the pavement has been struck off and compacted, it shall be finished with an approved longitudinal float. The Contractor may use a longitudinal float composed of one or more cutting and smoothing Floats, suspended from and guided by rigid frame. The frame shall be carried by four or more visible wheels riding on and constantly in contact with the forms.

The Contractor may use a longitudinal float which works with a sawing motion, while held in a floating position parallel to the road centre line and passing gradually from one side of the pavement to the other. Movements ahead, along the centre line of the road, shall be in successive advances of not more than half the length of the float.

Instead of using other type of longitudinal float a single machine which will affect satisfactory compaction, finishing and floating may be used. This machine may be towed by a spreading machine: This combination, finishing floating machine shall be equipped with screeds and vibrators as hereinafter specified for spreading and finishing machine Floating shall be accomplished by means of a non-oscillating float held in a suspended position from the frame.

If any spreading, Finishing and floating equipment is not maintained in full working order or if the equipment as used by the Contractor proves inadequate to obtain the results prescribed, such equipment shall be improved or satisfactory equipment substituted or added at the direction of the Engineer.

#### **General Requirement:**

The concrete shall be spread uniformly immediately after it is placed and shall be levelled and then struck-off to such an elevation that, when properly compacted, the surface will conform to the required grade and cross-section. The strike board shall be moved forward with a combined longitudinal and transverse motion, the manipulation being such that neither end is raised from the side forms during the process. While striking off, a slight excess of concrete shall be kept in front of the cutting edge at all times. Prior to tamping, the concrete along the forms shall be thoroughly spaded or vibrated. The entire area of pavement shall be tamped or vibrated in a manner that will ensure maximum compaction. The concrete shall be brought to the required grade and shape by the use of a tamper consisting of a heavy plank whose length exceeds the width of the pavement by 300 mm or by the use of a mechanical vibrating unit spanning the full width of the spread. The tamper shall be constructed with properly trussed rods to stiffen it and prevent sag and shall be shod with a heavy strip of metal for a tamping surface. The tamper shall be moved with a combined tamping and longitudinal motion, raising it from side form and dropping it so that the concrete will be thoroughly compacted and rammed into place. A small surplus material is compacted and rammed into front of the tamper or vibrating unit and tamping or vibrating shall continue until the true cross-section is obtained and the mortar flushes slightly to the surface.

#### **e. Expansion and Construction Joints**

All the expansion and construction joints shall be carefully formed as shown on the Drawings or as directed by the Engineer. The joint filler together with the preformed groove shall provide complete separation of adjacent slabs or building. The preformed chase shall be thoroughly cleaned of all dust, debris, stones or other hard material.

All joints are to be filled with flexcell expansion joint filler, or an approved elastic, compressible, durable, and rot-proof equivalent of sufficient rigidity to enable it to be satisfactorily installed in the joint and resist deformation during the passage of the concreting equipment. The filler is to be of the same thickness as the joint width.

Construction joints shall be provided as shown on the Drawings.

The assembly and method of constructing the expansion joints/construction joints shall be subject to the approval of the Engineer

### **Consolidation**

- a. All concrete shall be consolidated by vibration, spading, rodding or forking so that the concrete is thoroughly worked around the reinforcement, around embedded items, and into corners of forms, eliminating all air or stone pockets which may cause honeycombing, pitting, or planes of weakness. Internal vibrators shall have a minimum frequency of 8000 vibrations per minute and sufficient amplitude to consolidate the concrete effectively. They shall be operated by competent workmen. Use of vibrators to transport within forms shall not be allowed. Vibrators shall be inserted and withdrawn at points approximately 1-1/2 ft. (1/2 meter) apart. At each insertion, the duration shall be sufficient to consolidate the concrete but not excessive so as to cause segregation, generally from 5 to 15 sec. A spare Vibrator shall be kept on the job site during all concrete placing operations. Where the concrete is to have an as-cast finish, a full surface of mortar shall be brought against the form by the vibration process, supplemented, if necessary, by spading to work the coarse aggregate back from the formed surface.
- b. If there is any tendency for the mix to segregate during consolidation, particularly if this produces excessive resistance, the mix proportions shall be modified to effect an improvement in the quality of the concrete to the satisfaction of the Engineer and in conformity with the provisions of Clause 5.
- c. Vibrators shall not be allowed to touch the formwork or the reinforcing bars during consolidation operation.
- d. Mechanical vibrators shall be of a type suited in the opinion of the Engineer to the particular conditions
- e. Over vibration or vibration of very wet mixes is harmful and should be avoided.

### **Curing and Protection**

- a. Beginning immediately after placement, concrete shall be protected from premature drying, excessively hot or cold temperatures and mechanical injury, and shall be maintained with minimum moisture loss at a relative constant temperature for the period necessary for hydration of the cement and hardening of the concrete. The materials and methods of curing shall be subject to approval of the Engineer
- b. For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing

Pending or continuous sprinkling.

Application of absorptive mats or fabric kept continuously wet.

Application of waterproof sheet materials approved by the Engineer.

Application of other moisture-retaining covering as approved

Application of a curing compound conforming to ASTM C 309 type 2. The compound shall be applied in accordance with the recommendations of the manufacturer immediately after any water sheet which may develop after finishing has disappeared from the concrete surface. It shall not be used on any surface against which additional concrete or other material is to be bonded unless it is proved that the curing compound will not prevent bond, or unless positive measures are taken to remove it completely from areas to receive bonded applications.

- c. Moisture loss from surface placed against wooden forms or metal forms exposed to heating by the sun shall be minimized by keeping the forms wet until they can be safely removed. After form removal, the vertical faces of concrete shall be cured until the end of the time prescribed in sub-clause 5.13.4 by one of the methods of sub-clause 5.13.2.
- d. Curing in accordance with sub-clause 5.13.1 & 5.13.2 above shall be continued for at least 14 days in the case of all concrete except concrete with rapid-hardening Portland Cement for which the period shall be at least 3 days. Alternatively, if tests are made of cubes kept adjacent to the structure and cured by the same methods, moisture retention measures may be terminated when the average compressive strength has reached 70 percent of the minimum specified works cube strength. If one of the first four curing procedures of sub-clause 5.13.2 is used initially, it may be replaced by one of the other procedures of that sub-clause any time after the concrete is one day old provided the concrete is not permitted to become surface dry during the transition.
- e. When the mean daily outdoor temperature is less than 410F then temperature of the concrete shall be maintained between 50 0F – 68 0F for the required curing period.
- f. When necessary, arrangements for heating, covering insulation or housing the concrete work shall be made in advance of placement and shall be adequate to maintain the required temperature without injury to concentration of heat. Combustion heaters shall

not be used during the first 24 hours unless precautions are taken to prevent exposure of the concrete to exhaust gases which contain carbon dioxide.

- g.** When necessary, provision for wind-brakes, shading for spraying, sprinkling, ponding or wet covering with a light colored material shall be made in advance of placement, and such protective measures shall be taken as quickly as concrete hardening and finishing operation will allow.
- h.** Changes in temperature of the air immediately adjacent to the concrete during and immediately following the curing period shall be kept as uniform as possible and shall not exceed 370F in any one hour or 500F in any 24 hour period.
- i.** During the curing period, the concrete shall be protected from damaging by mechanical disturbances, such as load stresses, heavy shock and excessive vibrations. All finished concrete surfaces shall be protected from damage by construction equipment, materials or methods by application of curing procedures, and by rain or running water. Self-supporting structures shall not be loaded in such a way as to overstress the concrete. No traffic should be allowed on pavement for at least 7 days after casting.

#### **Works in Extreme Weather**

- a.** Unless adequate protection is provided and approval is obtained, concrete shall not be placed during rain. Rain water shall not be allowed to increase the mixing water nor to damage the surface finish.
- b.** When the temperature of the surrounding air is expected to be below 41 °F during placing or within 24 hours thereafter, the temperature of the plastic concrete, as placed, shall be no lower than 55 degree F for sections less than 300 mm in any dimension nor 50 OF for any other.
- c.** During hot weather, the temperature of the concrete as placed shall met be so high as to cause difficulty from loss of slump, flash set, or cold joints and should riot exceed 900F. When the temperature of the concrete exceeds 900F precautionary measures approved by the Engineer shall be put into effect. When the temperature of the steel is greater than 1220F steel forms and reinforcement shall be sprayed with water just prior to placing the concrete ingredients shall be cooled before mixing, or flaked ice or well crushed ice of a size that will melt completely during mixing may be substituted for all part of the mixing water if, due to high temperature, low slump, flash set or cold joints are encountered.

Other precautions recommended by ACI 305 shall also be adopted.

## **6. TEST OF CONCRETE QUALITY**

The Contractor shall provide samples of concrete for testing at the Engineer's direction. Proper facilities shall be provided for making and curing the test specimens in accordance with PS 560 and PS 849. A competent person shall be employed by the Contractor whose first duty shall be to supervise all stages in the preparation and placing of the concrete. All test specimens shall be made and site tests carried out under his direct supervision.

Test sample shall be taken at the mixer or as directed by the Engineer. The test specimens shall be cured in accordance with PS 560, PS 849 and BS 1881. The strength shall comply with the standard of quality specified in table 1.

The five test cubes are to be tested for compressive strength as specified in BS 1881. These tests shall be carried out at site or in a laboratory approved by the Engineer. Two cubes shall be tested at the age of seven days and three at 28 days and the strengths determined are to comply with the standard of quality specified. The laboratory tests shall be carried out by an independent organization, such as Government Testing Laboratory or such other undertakings approved by the Engineer. The original test reports received from the above authorities should be submitted to the Engineer.

For all grades of concrete, the appropriate strength requirement shall be satisfied if none of the strengths of the cubes is below the specified cube strength or if the average strength of the three cubes is not less than the specified cube strength and the difference between the greatest and the least strength is not more than 20% of the average.

When the results of works cube tests show that the strength of any concrete is below the minimum specified the Engineer may give instructions for the whole or part of the work concerned to be removed and replaced at the expense of the Contractor. The Contractor shall bear the cost of any other part of his, or any other contractor's work, which has to be removed and replaced as a result of the defective concrete. If any concrete is held to have failed, the Engineer may order the proportions of that class of concrete to be changed in order to provide the specified strength.

## **7. FINISHING OF FORMED SURFACES**

### **General**

- a. After removal of forms, the surfaces of concrete shall be given one or more of the finishes specified below in locations designated by the Contract Documents.
- b. When finishing is required to match a small sample furnished to the Contractor, the sample finish shall be reproduced on an area at least 100 sq.ft. in an inconspicuous location designated by the Engineer before proceeding with the finish in the specified location.

- c. Allowable deviations from plumb or level and from the alignment, profile grades, and dimensions are specified in clause 9. Tolerances for concrete construction are defined as tolerances to be distinguished from irregularities in finish as described herein. The finish requirements for 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 in concrete finishes. 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 surface irregularities are within the limits herein after specified, surface irregularities are classified as abrupt or gradual. Offsets caused by displaced or misplaced form sheating or lining or section, 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 curved surfaces. The length of the template 2 metre for testing of formed surfaces and 3 metre for testing of unformed surfaces.

#### **As-cast Finishes**

Unless otherwise specified or indicated on the Drawings the classes of finish shall apply as follows:

a. **Rough form finish:**

No selected form facing materials shall be specified for rough form finish surfaces. The holes and defects shall be patched. Otherwise, surfaces shall be left with the texture imparted by the forms.

b. **Fair face finish:**

Fair face finish applies to concrete 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. Surfaces of concrete structures requiring fair face finish as shown in the Drawings. Surface irregularities, measured as described in sub-clause 7.2.1, 'Rough form finish', shall not exceed 4 mm for gradual irregularities and 6mm for abrupt irregularities, except that abrupt irregularities will not be permitted at construction joints. Abrupt irregularities at construction joints and elsewhere in excess of 6 mm and gradual irregularities in excess of 1/8 inch. (3mm) shall be reduced by grinding so as to conform to the specified limits. Abrupt irregularities at construction joints shall be ground on level of 1 to 20 ratio of height to length.

Unless otherwise approved, repair of imperfections in formed concrete shall be completed within 24 hours after removal of forms. The form facing material shall produce a smooth, hard, uniform texture on the concrete. It may be plywood, tempered concrete form grade hardboard metal, plastic paper, or other approved material capable of producing the desired fair face finish. The arrangement of the facing material shall be orderly and symmetrical, with the number of seams kept to the practical minimum. It

shall be supported by studs or other backing capable of preventing excessive deflection. Material with raised grain, torn surfaces, worn edge, patches, dents, or other defects which will impair the texture of the concrete surface shall not be used. The holes and defects shall be patched. All fins shall be completely removed

c. **Architectural Finish Concrete:**

Architectural finish to concrete formed surfaces as shown on the Drawings is required by the Engineer where the architectural appearance of surfaces of structures exposed to public view is of special consideration and importance. The Contractor shall use approved special material for formwork and design the forms in conformity with the specified architectural patterns, textures and finishes in order to obtain first class architectural finish on formed concrete surface without any defect, irregularities, blemishes, imperfections and encrustations.

Sample approvals of precast & in-situ concrete:

These samples will be reviewed and approved on the basis of colour, dimensional accuracy, and finish of surfaces and general appearance. The same requirements for sample approval will be required for both precast and in-situ concrete exposed surfaces.

**Forms**

The contractor must maintain the forms unusually tight and braces to prevent movement, mal-alignment and bleeding that will result in sand streaks, honeycomb, fins, stain or unsightly appearance.

If wood forms are chosen to be used by the Contractor they shall be constructed of 3/4 inch. (20mm) minimum thickness plywood constructed in a fashion to allow many re-uses with all surfaces sealed with a polyurethane varnish.

Edges, surfaces and corners of forms shall be sealed to prevent loss of any matrix or unequal absorption of water. Corners of wood forms shall be filled with suitable compound and all contact surfaces sealed with a polyurethane varnish.

Re-use of forms shall be subject to approval of the Engineer.

**Curing:**

Curing shall be done in shade (out of direct sunlight) and shall be for a minimum period of 4 days.

**Finishing procedures:**

**Finishing procedures for filling air void in smooth finished concrete developed by a formed surface**

While the concrete surface is still damp (not more than three days after removal of forms), apply a thin coat of medium consistency neat cement slurry by means of bristle brushes to provide a bonding coat within any pit or blemishes in the parent concrete; avoid coating large areas of the finished surface. Before slurry has dried or changed colour, apply a dry (almost crumbly) grout comprised of one part cement, of the type and brand of cement used in the original concrete, to one and one-half parts clean masonry sand with a fineness modulus of approximately 2.25 and complying with the gradation requirements of the ASTM Specifications C144. Mix proper amounts of white cement and colouring with the parent mortar to produce a satisfactory colour match with the parent concrete after hardening. Use samples previously prepared.

Apply the finishing grout uniformly with damp (neither dripping wet nor dry) pads of coarse burlap approximately 6 inch square used as a float. Scrub the grout well into the pits to provide a dense mortar in all the imperfections to be filled. Allow the mortar to partially harden, from one to two hours, depending upon the weather. Avoid direct hot sunlight. If the air is hot and dry, keep the concrete surface damp during this period using a fine fog spray. When the grout has hardened sufficiently so it can be scraped from the surface with the edge of a steel trowel without damaging the grout from the small pits or holes, cut off all that can be removed with a trowel without delay; next allow the surface to dry thoroughly and rub it vigorously with clean, dry burlap to completely remove any dried grout. No visible film of grout shall remain after this rubbing. Complete the entire cleaning and grouting operation for the grout to dry after it has been cut with the trowel, so it can be wiped off clean with the burlap.

On the day after the repair work, the concrete surfaces should again be wiped off clean with dry burlap to remove any inadvertent dust leave no built-up surfaces on the parent surfaces. Employ, if possible a used piece of burlap containing old hardened mortar to act as a mild abrasive. Use of fine abrasive stone if needed to remove any remaining built-up film without breaking through the surface film of the original concrete. Such scrubbing should be light and sufficient only to remove excess material without working up a lather of mortar or changing the texture of concrete. Following the final bagging or stoning operation, provide a thorough wash down with stiff bristle brushes to remove all extraneous materials and spray the concrete surface with a fine fog spray periodically to maintain a continually damp condition for at least three days after application of the pit repair grout.

### **Rust Stains:**

All rust stains are to be removed employing the following procedure:

The rust stain shall be soaked for 10 minutes with a solution of (0.055 lb.) 25gm of sodium citrate in (0.33lb) 150 gms water (brushing the solution at short intervals is satisfactory). Then the surface is sprinkled with crystals of sodium hydrosulfite and covered with a paste of Fuller's Earth and water. On a vertical surface, the paste is applied with a trowel, with the crystals first sprinkled on the paste so they will be in direct contact with the stain. The paste is allowed to dry for 10 minutes then scraped off and the treatment repeated if necessary.

### **Repairing of Formed Surfaces:**

It is the intention of Specification to require, forms, mixture of concrete and workmanship so that concrete surfaces, when exposed, will require no patching. Any concrete which is not formed as required and conforming to approve samples or for any reason is out of alignment or level or shows a defective surface, shall be removed from the job by the Contractor at his expense unless the Engineer grants permission to repair the defective area. Permission to patch any such area shall not be considered as waiver of the Engineer's right to require a complete removal of defective work if the repair does not, in his opinion, satisfactorily restore the quality and appearance of the surface. The Engineer shall be the sole judge of acceptability of appearance.

## **8. REPAIR OF SURFACE DEFECTS**

### **General**

- a. Any concrete failing to meet the specified strength or not formed as shown on drawings, concrete out of alignment, concrete with surfaces beyond required tolerances or with defective surfaces which cannot be properly repaired or patched in the opinion of the Engineer shall be removed at contractor's cost. The Engineer may reject any defective concrete and order it to be cut out in part or in whole and replaced at the Contractor's expense.
- b. All ties and bolt holes and all repairable defective areas shall be patched immediately after form removal.

### **Repair of Defective Areas**

- a. All honeycombed and other defective concrete shall be removed down to sound concrete. The area to be patched and an area at least 6 inch. (150 mm) wide surrounding it shall be dampened to prevent absorption of water from the patching mortar. A bonding grout shall be prepared using a mix of approximately 1 part cement to 1 part fine sand passing a No. 25 BS Sieve and shall then be well brushed into the surface.
- b. The patching mixture shall be made of the same material and of approximately the same proportions as used for the concrete, except that the coarse aggregate shall be omitted and the mortar shall consist of not more than 1 part cement to 2-1/2 parts sand by damp loose volume. White Portland cement shall be substituted for a part of the grey Portland cement on exposed concrete in order to produce a colour matching the colour of the surrounding concrete, as determined by a trial patch.
- c. The quantity of mixing water shall be no more than necessary for handling and placing. The patching mortar shall be mixed in advance and allowed to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.

d. After surface water has evaporated from the area to be patched, the bond coat shall be well brushed into the surface. When the bond coat begins to lose the water sheen, the premixed patching mortar shall be applied. The mortar shall be thoroughly consolidated into place and struck off so as to leave the patch slightly higher than the surrounding surface to permit initial shrinkage it shall be left undisturbed for at least 1 hour before being finally finished. The patched area shall be kept damp for 7 days. Metal tools shall not be used in finishing a patch in a formed wall which will be exposed

e. Where as-cast finishes are specified, the quantity of patched area shall be strictly limited. The combined total of patched areas in as-cast surfaces shall not exceed 6 sq.ft. in each 100 sq.ft. of as-cast surface. This is in addition to form tie patches, if the project design permits ties to fall within as-cast areas.

f. Any patches in as-cast architectural concrete shall be indistinguishable from surrounding surfaces. The mix formula for patching mortar shall be determined by trial to obtain a good colour match with the concrete when both patch and concrete are cured and dry. After initial set, surfaces of patches shall be dressed manually to obtain the same texture as surrounding surfaces.

g. Patches in architectural concrete surfaces shall be cured for 7 days. Patches shall be protected from premature drying to the same extent as the body of the concrete.

#### **Tie and Bolt Holes**

After being cleaned and thoroughly dampened, the tie and bolt holes shall be filled solid with patching mortar.

#### **Proprietary Materials**

If permitted or required by the Engineer, proprietary compounds for adhesion or as patching ingredients may be used in lieu of or in addition to the foregoing patching procedures. Such compounds shall be used in accordance with the manufacturer's recommendations with prior approval of the Engineer.

### **9. CONCRETE CONSTRUCTION TOLERANCE**

Where tolerances are not stated in the specifications or drawings for any individual structure or feature thereof maximum permissible deviations from established lines, grades and dimensions shall conform to the following. The Contractor is expected to set and maintain concrete limits. These allowable tolerances shall not relieve the Contractor of the responsibility for correct fitting of indicated materials. Those tolerances are not cumulative.

Variation from the plumb (or the specified better for inclined walls)

a. In the lines and surfaces of columns, piers, and walls and in arches.

In any 10 ft. (3 meter) of length or height:	1/4" (6 mm)
In any storey or 20 ft. (6 meter) maximum:	3/8" (10 mm)
Maximum for the entire length or height:	1" (25 mm)

**b.** For exposed corner columns, control joint grooves and other conspicuous lines.

In any bay or 20 ft. (6 meter) maximum	1/4" (6 mm)
Maximum for the entire length or height	1/2" (13 mm)

Variation from the level or from the grades indicated on the drawings.

**a.** In floors, ceilings, beams soffits and in arises.

In any 10 ft. (3 meter) of length	1/4" (6 mm)
In any bay or 20 ft. (6 meter) maximum	3/8" (10 mm)
Maximum for the entire length	3/4" (20 mm)

**b.** For exposed Lintels, sills, parapets, horizontal grooves, and other conspicuous lines.

In any bay or 20 ft. (6 meter) maximum	1/4" (6 mm)
Maximum for the entire length	3/8" (10 mm)

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

In any bay or 10 ft. (3 meter) maximum	1/2" (13 mm)
Maximum for the entire length	1" (25 mm)

Variation in the sizes and locations of sleeves,  
Floor openings and wall openings. +1/4" (+6mm)

Variation in cross-sectional dimensions of columns and beams  
and in the thickness of slabs and walls.

Minus	1/4" (6mm)
Plus	1/2" (13mm)

Footings

a. Variation in dimensions in plan Minus

Minus 1/2" (13 mm)

Plus (plus variation applied to concrete only, not to reinforcing bars or dowels).

b. Misplacement or eccentricity

2 percent of the footing width in the direction of misplacement but not more than (applies to Concrete only, not to reinforcing bars or dowels). 2" (15 mm)

c. Reduction in thickness

Minus 5 percent of specified thickness

Variation in Steps

a. Rise 1/8" (3 mm) Tread  
1/4" (6 mm)

b. In consecutive steps:

Rise 1/16" (1.5 mm)  
Tread 1/8" (3 mm)

Tolerances for Pavements

- a. Departure from established alignment ± 1/2" (413mm)
- b. Departure from established longitudinal grade on any time. ±1/4" (±6mm)
- c. Departure from transverse template contour except at transverse joints. ± 1/8" (3mm)
- d. Departure from transverse template transverse joints, width of one traffic lane ±1/8" (+3mm) contour at

Pavements for parking areas

The tolerances are twice the values listed for pavements.

**10. ACCEPTANCE OF STRUCTURE**

### **General**

- a. Completed concrete work which meets all applicable requirements will be accepted subject to the other terms of the Contract Documents.
- b. Completed concrete work which fails to meet one or more of the requirements and which has been repaired to bring it into compliance will be accepted subject to the other terms of the Contract Documents.
- c. Completed concrete work which fails to meet one or more of the requirements and which cannot be brought into compliance may be accepted or rejected as provided in these Specifications or in the Contract Documents. In this event, modifications may be required to assure that remaining work complies with the requirements.

### **Dimensional Tolerances**

- a. Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of clause 9 shall be considered potentially deficient in strength and subject to the provisions of sub clause 9.4
- b. Formed surfaces resulting in concrete outlines larger than permitted by the tolerance of clause 9 may be rejected and the excess material shall be subject to removal. If removal of the excess material is permitted, it shall be accomplished in such a manner as to maintain the strength of the section and to meet all other applicable requirements of function and appearance. Permission is required if excess material is to be removed in accordance with this clause.
- c. Concrete members cast in the wrong location may be rejected if the strength, appearance or function of the structure is adversely affected or if misplaced items interfere with other construction.
- d. Inaccurately formed concrete surfaces exceeding the limits of Clause 9 or of Clause 5.1 of Section Formwork' shall be removed and replaced and those that are exposed to view, may be rejected and shall be repaired or removed and replaced if required.

### **Appearance**

- a. Architectural concrete with surface defects exceeding the limitations of Subclause 5.1 of Clause 5 of the Section, 'Formwork' shall be removed and replaced.
- b. Other concrete exposed to view with defects which adversely affect the appearance of the specified finish may be repaired only by approved methods.
- c. Concrete not exposed to view is not subject to rejection for defective appearance.

### **Strength of Structure**

a. The strength of the structure in place will be considered potentially deficient if it fails to comply with any requirements which control the strength of the structure, including but not necessarily limited to the following conditions.

Concrete strength requirements not considered to be satisfied in accordance with clause 6 hereof

Reinforcing steel size, quantity, strength, position or arrangement at variance with the requirements as listed under specification of 'Reinforcement' or in the contract documents.

Concrete which differs, from the required dimensions or location in such a manner as to reduce the strength.

Curing less than that specified.

Inadequate protection of concrete from extremes of temperature during early stages of hardening and strength development.

Mechanical injury, construction fires, accidents of premature removal of formwork likely to result in deficient strength.

Poor workmanship likely to result in deficient strength.

b. Structural analysis and/or additional testing may be required when the strength of the structure is considered potentially deficient.

c. Core tests may be required when the strength of the concrete in place is considered potentially deficient.

d. Core tests are inconclusive or impractical to obtain or if structural analysis does not confirm the safety of the structure, load tests may be required and their result evaluated in accordance with British Standard, CP 110 or ACI 318.

e. Concrete work judged inadequate by structural analysis or by results of a load test shall be reinforced with additional construction if so directed by the Engineer or shall be replaced, at the Contractor's expense.

f. The Contractor shall pay all costs incurred in providing the additional testing and/or analysis required by this section.

g. All costs of additional testing and/or analysis which is made at the Employer request and which is not required by these Specifications, or by the Contract Documents shall be borne by the Contractor

### **11. VAPOUR BARRIER**

Vapour barrier shall be polyethylene building film, the film shall be 200 micron thick.

The quality of material shall be approved by the Engineer prior to use in the works.

Vapour barrier shall be laid in position wherever shown on the Drawings or as directed by the Engineer.

The material shall be supplied in rolls and laid by rolling over the prepared surface at the levels and position in the areas shown on the Drawings. Where joint is necessary at the side or end of a sheet, this shall be a double weld folded joint made by placing the edges together and folding over twice continuously taking the top edge prior to concreting. The Contractor shall protect the film sheets from damages during laying and subsequent operations and shall replace at his cost all damaged film sheets to the satisfaction of the Engineer.

Manufacturer's recommendations and instructions along with the sample of material shall be submitted to the Engineer for his approval.

## **12. PVC WATER STOP/HYDROFOIL**

### **Material**

All PVC water stops/hydrofoil shall be central bulb type from a manufacturer approved by the Engineer. The specific gravity of PVC water stop/hydrofoil shall not be less than 1.37 & full stretch Break cut intensity when tested at normal temperature shall not be less than 1878 Psi.

The material shall have a modulus of rigidity of 853 Psi at 50 OF & 10544 Psi at 68 OF.

### **Placing & Connections**

In general all PVC water stops/hydrofoil shall be placed in the centre of the structural member. Each piece of the water stop-hydrofoil shall be of maximum practicable length. An ordinary sharp knife saw or any other sharp tool can be used to cut the water stop. Joints at inter sections and at ends of pieces shall be made in the manner most appropriate to the material being used. Joints shall develop effective water tightness fully equal to that of the continuous water stop material and shall permanently retain their flexibility. For straight line connection melting method of connection can be used by pressing two water stops intended for connection against a heated iron or copper sheet. When they are melted, the two are combined.

After joining, the water stop should be allowed to cool.

For all other connections such as T-type or L-type, the welding method of joining should be used. Welding rod of same material as the water stop shall be used. The welding rod & the water stop shall be heated & melt at the same time, by means of heated air jetting from the hot jet gun.

### **13. MEASUREMENT AND PAYMENT**

#### **13.1 Method of Measurement**

Concrete will be measured for the number of cubic feet acceptably placed complete in all respects as per Drawings and in strict accordance with this section of specification.

#### **13.2 Basis of Payment**

Payment will be made in accordance with the unit prices in the Bill of Quantities for the various items in accordance with the specifications and shall constitute full compensation for furnishing all materials, shuttering, equipment and labour and for performing all operation necessary to complete the work.

## **SECTION - 205**

### **STRUCTURAL STEEL WORKS**

#### **1. SCOPE OF WORK**

The work covered by this section, consists of supply of all material, labour, plant, equipment and appliances including welding, bolts, nuts, washers, anchor bolts, embedded parts etc, fabrication, erection and painting in accordance with the specifications and as per drawings and as directed by the Engineer.

#### **2. DRAWINGS**

Design drawings shall be prepared by the Engineer and supplied to the Contractor. These shall contain main dimensions, sizes of members, typical details of joints.

Workshop drawings shall then be prepared by the Contractor from the design drawings supplied and submitted to the Engineer for approval. Fabrication shall not be commenced until approval of workshop drawings has been obtained from the Engineer.

#### **3. MATERIAL**

Except otherwise stated in the drawings, the material specifications shall conform to the following. Wherever necessary the Contractor may use equivalent alternative material subject to approval of the Engineer.

##### **Structural Steel**

Structural steel for structures shall conform to the requirements of ASTM A-36 or equivalent

##### **Steel Forging**

Steel forging shall conform to the requirements of ASTM A235.

### **Steel Casting**

Steel casting shall conform to the requirements of ASTM A27.

### **Welding**

Welding Electrodes for manual shielded metal arc welding shall conform to AWS A 5.1 latest edition or the A 5.5 latest edition. Equivalent locally manufactured electrodes may be used subject to the approval of the Engineer.

Common Bolts, Anchor Bolts, Nuts and Washers Bolts and Nuts shall conform to the requirements of ASTM A 307.

### **High Strength Bolts**

High strength carbon steel bolts including nuts and washers shall conform to the requirements of ASTM A325 latest editions and of AISI B18.2

### **Washers**

Cut Washers shall be of structural grade steel and shall conform to the dimension of the manufacturer's regular standard for plain washers for the size of bolts used.

### **Cast Iron**

Shall conform to the requirements of latest edition of ASTM A 48.

## **4. FABRICATION**

### **Straightening of Material**

Rolled material, before being worked upon must be straightened within tolerances, by ASTM specifications A6 Straightening, necessarily shall be done by mechanical means or by the application of a limited amount of localized heat. The temperature of heated areas, as measured by approved methods, shall not exceed 1100 0F for A514 steel or 1200 0F for other steels.

### **Cutting**

As far as possible cutting must be done by shearing. Oxygen cutting shall be done where shear cutting is not possible and shall preferably be done by Machine. All edges shall be free from gauges, notches or burs. If necessary the same shall be removed by grinding.

### **Holes Punching Drilling.**

Holes shall be punched where thickness of the material is not greater than the diameter of bolt +3 mm. Where the thickness of the material is greater the holes shall either be drilled or sub-punched and reamed to size. The die for all sub-punched holes and the drill to all subdrilled holes shall be at least 1.58 mm smaller than the nominal diameter of the rivet or bolt. Holes for A514 steel plates over 13 mm thick shall be drilled.

### **Welding**

#### **a. General:**

The execution and inspection of welding will be done in accordance with the provisions of the American welding society code for welding in Building construction, D1.0. No welding for piping/electrical supports shall be made transversely to any tension flanges of trusses, beams or columns.

#### **b. Automatic sub-merged Arc Welding:**

For all built-up members, i.e. sections fabricated from plates and flat bars or compound rolled sections, plate and box girders, where long continuous, welding is to be done, should be executed by Automatic submerged Arc Welding process in accordance with relevant AWS specifications.

c. Maximum and minimum size and lengths of fillet welds shall be in accordance with AISC specifications.

Surface to be welded shall be free from loose scale, slag, rust, grease, paint or any other foreign matter except mill scale which withstands vigorous wire brushing.

### **Tolerances**

A variation of 1 mm is permissible in the overall length of members with both ends finished for Contact bearing. The bearing surfaces prepared to a common plane by mining.

Members without end finished for contact bearing which are to be framed to other steel parts of the structure shall have a variation from detailed length not greater than 3 mm.

## **5. SURFACE PREPARATION / PAINTING**

### **Surface Preparation**

All structural steel material i.e. rolled steel sections, plates, pipes, flat bars, chequered plates shall be cleaned free from loose scale, rust, burrs slag, etc. by means of sand blasting.

### **Painting**

a. Immediately after surface preparation all material shall be given one prime coat of rust preventive paint.

- b. After fabrication one shop coat of prime paint and then one coat of enamel paint shall be applied.
- c. One final coat of enamel paint shall be applied after erection of all components.
- d. The type of primer and enamel paints to be applied shall be as specified on the drawings.
- e. All other requirements for the specified paint system shall be in accordance with the paint manufacturer's specification recommendations.
- f. The Contractor shall use the best quality of the type of paint specified and shall get the same approved by the Engineer.
- g. Steel work/Surfaces not to be painted
  - Steel work to be encased/embedded in concrete or surface in coated with contact with concrete or grout shall not be painted, but shall be given a cement wash after sand blasting.
  - Machined finished surfaces shall not be painted but shall be coated with rust preventive compound, (approved by the Engineer) immediately after finishing. Such surfaces shall also be protected with wooden pads or other suitable means for transportation. Unassembled pins, keys, and bolt thread shall be greased and wrapped with moisture resistant paper.

## **6. INSPECTION AND TESTS**

Manufacturer's Work Test Certificate for all material used shall be furnished by the contractor for Engineer's scrutiny and approval.

Rolling tolerance of all shapes and profile according to AISC shall be in accordance with the provisions of the American Society for Testing and Materials Designation A.6. These shall be checked by the Contractor before being worked upon and shall be rejected if found not within limits.

The Contractor shall arrange for analysis and test of all material rolled locally at a testing laboratory selected by the Engineer.

### **Inspection of Welding.**

The inspection of welding shall be performed in accordance with the American Welding Society specifications, as directed by the Engineer.

### **Rejection**

Materials or workmanship not in reasonable conformance with the provisions of these specifications shall be rejected at any time during the progress of the work or the completion and erection at site.

## **7. MISCELLANEOUS STEEL WORKS**

### **General**

The work covered shall include furnishing, fabricating, installing and painting miscellaneous steel work include the following

- Steel windows/ventilators
- Steel louvered doors
- Steel rollup shutter
- G.I. flashing
- Steel gate and steel fence ☐      Steel ladders/rungs.
- Steel gratings
- Moulded steel sheet door frames
- Steel railing/fencing
- Steel grill
- Steel wire gauze

All steel fabricated items shall conform to the drawings, details and instructions of the Engineer. Contractor shall submit detailed shop/erection drawings of the above listed items to the Engineer for approval. Drawing, material, fabrication, surface preparation shall conform to the applicable requirements of relevant clauses of these specifications. Any proposed deviation due to field conditions and availability of local material shall be submitted to the Engineer for approval.

## **8. MEASUREMENT AND PAYMENT**

### **8.1 Method of Measurement**

Measurement and payment for miscellaneous items shall be made as per the unit included in the priced bill of quantities.

### **8.2 Basis of Payment**

Payment shall be made for the number of units of the item as provided above at the contract unit price per linear feet to furnish, construct and shaping the item and shall constitute full compensation for all work related to the item.

**SECTION - 206**  
**BRICK MASONRY AND**  
**CEMENT CONCRETE BLOCK MASONRY**

## **1. SCOPE OF WORK**

This section consists of construction of brick/ cement concrete block work walls of any thickness with first class hand-mould and/or machine pressed bricks/cement concrete blocks with the specified ratio of cement mortar in foundation, plinth superstructure or for any other structure as directed by the Engineer, or shown in the Bid Schedule. The Contractor shall furnish all materials and all other requirements to produce finished brick/block work. Brick/block work and materials for brick/block work shall be in strict accordance with this section of the specifications and applicable drawings and subject to the terms and conditions of the Contract.

## **2. MATERIALS**

### **2.1 Portland Cement**

Portland cement shall conform to the stipulations and requirements set forth in Section "CONCRETE".

### **2.2 Mortar Sand**

Sand for mortar used in construction of brickwork/blockwork required under these Specifications shall be furnished by the Contractor in accordance with the provisions and in conformity with the stipulations and requirements of ASTM Designation C144-70 or latest revision and shall have a fineness modulus between 1.6 to 2.5.

### **2.3 Water**

The water used in the preparation of mortar shall be free from objectionable quantities of silt, organic matter, alkali salts and other impurities and it will be tested in accordance with BS-3148 and approved by the Engineer at the Contractor's cost.

### **2.4 Aggregate**

Aggregates for mortar shall comply with the requirements of ASTM C144. Sand that has been in contact with seawater shall not be used unless it has been thoroughly washed to the satisfaction of the Engineer.

### **2.5 Additives**

Additives where used, shall be proprietary products used in the proportions and manner recommended by the manufacturer. The additives shall in no way adversely affect the mortar strength or contain chemicals, which may be harmful to other building materials. To add gypsum to cement is strictly forbidden.

## **3. MORTAR AND GROUT**

Materials for mortar, sand binding agent and water shall be mixed by volume for at least 3 minutes with the minimum amount of water to produce a correctly mixed mortar or grout of workable consistency in a mechanical batch mixer. For small jobs, hand mixing may be permitted, the ingredients being mixed with sufficient water to produce a correctly mixed workable mortar. Mortar used in masonry construction shall conform to ASTM C-270 standard.

Mortars shall be mixed in batches, which can be used within a period before the setting process commences. Once a mix begins drying off, it shall be rejected. No ingredients shall be added to it once the setting process has begun. Mortar shall not be retained for more than 30 minutes and shall be constantly worked over with hoe or shovel until used.

#### **4. MORTAR BATCHING**

Methods or equipment used for mixing mortar shall be such as will accurately determine and control the amount of each separate ingredient entering into the mortar and shall be subject to the approval of the Engineer. If a mixer is used it shall be of approved design and the mixing time after the ingredients are in the mixer, except for the full amount of water, shall not be less than two minutes.

Mortar shall be mixed only in sufficient quantities for immediate use and all mortar not used within 30 minutes after addition of water to the mix shall be wasted. Retampering of mortar shall not be allowed. Mixing pans and troughs shall be thoroughly cleaned and washed at the end of each day's work.

#### **5. SCAFFOLDING**

Contractor shall provide safe scaffolding of adequate strength for use of workmen at all levels and heights at his own expense. Scaffolding which is unsafe in the opinion of the Engineer shall not be used until it has strengthened and made safe for use of workmen. Cost of scaffolding etc., shall be included by the Contractor in the unit rate for masonry items.

Damage to masonry from scaffolding or from any other object shall be repaired by the Contractor at his own cost.

#### **6. JOINTING**

Jointing is the forming of joints as work proceeds. Joints shall be as follows:

- 6.1 Exterior exposed joints shall be tightly formed to a weather joint with the point of the trowel.
- 6.2 Interior exposed joints shall be tightly formed to a concave joints.
- 6.3 Joints which are subsequently covered with plaster or other finish materials shall be struck flush.

## **7. BRICKS**

The bricks used shall be of standard size (9"x4.5"x3") first class well burnt, uniform in shape, size, texture, colour and should produce a ringing sound when struck. The bricks shall be free from flaws, cracks, chips, stone nodules of lime or kan-kar or any other blemishes. The brick shall not absorb more than one sixth of its weight when soaked in water for one hour. Compressive strength shall not be less than of 2,000 psi. Bricks over burnt, under burnt vitrified and irregular shall not be used. Bricks of uniform size shall be used throughout the work and source of supply shall not be diversified.

### **7.1 Soaking**

Before use all bricks shall be soaked in clean water in tanks or pits for at-least two hours.

### **7.2 Laying of Bricks**

All brickwork shall be skillfully laid with level courses, uniform joints, square corners, plumb verticals and true surfaces except when otherwise shown on the Drawings or directed by the Engineer. Brickwork will be of best standard of workmanship obtainable and objectionable offsets in the brickwork shall be avoided. Smoothest practicable finished surface of the brickwork shall be ensured. Unless otherwise specified bricks shall be laid in English Bond with frogs (Manufacturer's marks) upward.

All horizontal joints shall be parallel and truly level. Vertical joints in alternate courses shall come directly over one another. Thickness of joints unless otherwise specified shall not be less than 1/4 of an inch and not more than 3/8 of an inch. The height of 4 courses and 3 joints as laid shall not exceed by more than 1 inch the height of 4 bricks as piled one upon the other.

### **7.3 Curing**

All brick work involving use of cement shall be cured by water curing or other acceptable methods. The Engineer shall approve all methods and operations of the Contractor in curing different portions of work.

When curing by water brickwork shall be kept wet for at least 14 days by covering with water saturated materials or by a system of perforated pipes, mechanical sprinklers, porous hose, ponding or by any other approved method which will keep all surfaces to be cured continuously wet. Water used for curing shall meet the requirements given in Clause 3.2 of these specifications.

## **9 DAMP PROOF COURSE**

### **9.1 In walls — Horizontal Application**

All damp proof course unless otherwise specified shall consist of class 'C' cement concrete 2 inch thick shall be laid at required levels as per drawings and instructions of the Engineer. The D.P.C shall be tamped, consolidated, levelled and edges and corners made to the

requirements of the relevant drawings including finishing and curing complete. After the DPC has dried apply two coat of bitumen 10/20 grade @ 20 lb/100 sq.ft.

### **9.2 In walls — Vertical Application**

A damp proof course shall be applied if shown on the drawings, on wall below plinth shall consists of cement sand plaster (1:6) ¾" thick shall be applied on walls below plinth on interior and exterior faces as shown in the drawings or as directed by the Engineer. After a curing period of 3 days hot bitumen 10/20 grade be applied on dried surface of mortar @20 lb/100 sq.ft. in two coats.

### **9.3 Under Floors**

A damp proof course if shown on the drawings shall be applied under the floors in the same way as specified under wall horizontal application.

## **10 MEASUREMENT AND PAYMENT**

### **10.1 Measurement**

Measurement for brick work shall include number of cubic ft. of block work provided within the limits as shown on the Drawings or as directed by the Engineer.

### **10.2 Basis of Payment**

Payment for brick work shall be made at the contract unit price per cubic feet. Payment shall constitute full compensation for furnishing all materials, equipment and labour including all incidentals necessary to complete the work.

## **SECTION - 207 CARPENTRY AND JOINERY**

### **1. SCOPE OF WORK**

The work covered under this section of Specifications consists of providing all material, labour, plant, equipment, appliances and performing all operations connected with the fabrication and erection of all woodwork, mill work, construction assembly, surface finish treatment and building in of all cabinet type items, supports etc. of wood or metal and

incidentals, associated woodwork appurtenances, procuring and applying preservatives, installation of Finish Hardware in connection with finish woodwork as per details shown on the Drawings or as directed by the Engineer. The scope of this section is covered with detailed specifications as laid down herein.

## **2. APPLICABLE STANDARDS**

Latest editions of following British and ISO Standards are relevant to these specifications wherever applicable.

### **2.1 ISO (International Organization for Standardization)**

- 1891 Bolts, screens, nuts and accessories-Terminology and nomenclature.
- 1097 Plywood - Measurement of dimensions of panels.
- 1098 Veneer plywood for general use-General requirements.
- 2427 Veneer plywood with rotary cut veneer for general use-Classification by appearance of panels with outer veneer of beech.
- 2429 Plywood Veneer plywood with rotary cut veneer for general useClassification by appearance of panels with outer veneers of brand leaved species of tropical Africa.
- 3804 Plywood- Determination of dimension of test pieces
- 3805 Plywood-Determination of density.
- 3806 Plywood-Determination of moisture content
- 6442 Door leaves-Measurement of defects of generates
- 6443 Door leaves-Measurement of dimensions and of defects of squareness.
- 6444 Door leaves-Test of behavior under humidity variations.

### **2.2 BSI (British Standards Institution)**

- 459 Wooden doors.
- 1186 Quality of timber and workmanship in joinery.
- 1127 Hinges
- 1331 Builder's hardware for housing.

1567	Wood door frames and linings nails
1202	Nails
1203	Specifications for synthetic resin adhesive for plywood.
1204	Synthetic resin adhesives for wood.
1282	Guide to choice, use and application of wood preservatives.
1494	Fixing accessories for building purposes.
1579	Connectors for timber.
3842	Treatment of ply wood with preservatives.

### 3. **MATERIALS**

#### 3.1 **Timber**

- a. All wood shall consist of cedrous deodar (referred in the document as deodar) having density of 500-600 kg/m<sup>3</sup>.
- b. Wood local known as Partal to be used in framing where specified.

#### c. **General Characteristics:**

All the timber shall be in accordance with the requirements of BSI No: 1186, quality of timber and workmanship in joinery. The whole of the timber shall be from the heart of sound and fully grown tree, uniform in substance, straight in fibre, first class quality properly seasoned, free from large or loose deadknots, 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 ten (10) percent.

#### d. **Preservation of Wood:**

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

The preservatives shall be of the best available quality of solignam oil (clear) 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 BSCP 98:1964.

#### e. **Adhesive:**

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

**f. Nails and Screws**

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

**3.2 Ply Wood**

a. The plywood shall comply in all respects with BSI No. 1455:1963. All the plywood shall only be obtained from manufactures approved by the Engineer.

Plywood used for doors, paneling 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.

b. The veneer shall be of the required thickness and quality including base veneer and shall be impregnated with an approved adhesive and machine compressed. 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.

**4. SAMPLES**

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

**5. FABRICATIONS**

**5.1 General**

Unwrought' timber shall be used. Sawing shall be done true to the size and dimensions to finally meet the requirements of specified sizes and dimensions of the finished work.

All framing shall be joined as shown on the Drawings or as directed by the Engineer. All joints shall be secured with sufficient number of nails. The Contractor shall perform all necessary mortising, tonguing, grooving, matching, tonguing, housing, rebating and all operations required for the correct jointing. The Contractor shall also provide all metal plates, screws, nails and other fixing material that may be ordered by the Engineer for the proper execution of the joinery work. Fabrication that develop defects due to bad workmanship or unsound materials not conforming to these specifications and the directions of the Engineer, shall be

cut out and replaced at Contractor's own expense before the expiry of the maintenance period.

## **5.2 Doors**

- a. Verify design and size of doors required for each opening. Door thicknesses shall be 40 mm (1 1/2 inch.) unless otherwise indicated.
- b. Fabricate flush wood doors in accordance with the following requirements.

### **Cores**

Edging of doors and shutters shall be of wood as shown on the drawings and cores shall be Partial wood (solid core) planed to a smooth uniform thickness. All doors and shutters shall have Deodar wood lipping on all edges as per details shown on the drawing.

### **Face Panels**

Door facing on each side of door shall consist of plywood have total minimum thickness of 1/8 inch. before sanding.

Door plywood shall be bonded to each other, and to core unit with approved adhesive and machine compressed.

## **6. PROTECTION OF MATERIALS**

All materials and assembled units shall be protected from weather and stored in such a way as to prevent decay and attack by fungus and termites.

## **7. WOODEN DOORS & DOOR FRAMES**

### **Materials**

- a. First class Deodar wood as approved by the Engineer shall be used for the door frames and full/half glazed and paneled shutters.
- b. The plywood and veneering shall be of selected best quality as approved by the Engineer.

### **Exterior and Interior Door Frames**

All exterior and interior door frames shall be constructed 18 SWG M.S sheet or of wood as shown on the drawings.

The door frames shall be secured in place by means of mild steel anchors welded/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 but not over 900 mm intervals between the top and bottom anchors.

### **Exterior and Interior Wooden Doors**

The Engineer shall unless otherwise shown or specified, of the paneled type, flush and type as shown on the Drawings or as direct the exterior and interior wooden door.

All the door shall conform to the following requirements:

Paneled doors shall be constructed in accordance with the requirements of Part I of British Standard Specification No. 459 with the additional requirements that panels in exterior openings shall be assembled with waterproof glue, glued tacked in place. Flush door shall comply with BSI 459 Part-2 and shall consist of solid core 40mm (1½ inch.) thick shutters as shown on drawings.

### **Door Shutters**

The shutters will be fixed to the frames with approved quality hardware schedule.

- a. All doors, shutters shall be fabricated in a workman manner strictly to the correct sizes and shapes as shown on the Drawings or as directed by the Engineer.
- b. The door shutters shall have solid core as shown on the Drawings. It shall be built in sections, properly jointed and glued together, both sides being covered with plywood of the required thickness and approved quality. The surfaces shall be prepared for painting or polishing.
- c. The arrangements of inner core for solid shutters shall be approved by the Engineer. It shall be so adjusted that circulation of air is free and uninterrupted. Minute holes shall be provided in edges at suitable places to admit and exit air.
- d. Each door shall be constructed so as to permit the installation of hinges, knobs and locks in the position shown on the Drawings.
- e. Completed doors shall be sound, rigid and free from defects and warp. All edges shall have Deodar wood tipping and shall be aligned and smooth, joints shall be close fitting, hard wood dowelled or mortised framed and of a strength to maintain the structure properties of the member connected. All adjoining faces and edges shall be flush and smooth. Edges shall be rectangular and solid

### **Fitting, Hanging and trimming**

All the doors shall be fitted, hung and trimmed as hereinafter specified and as indicated on the Drawings.

Doors shall have a clearance of 4 mm at sides and top unless otherwise directed by the Engineer and shall have 5 mm clearance at bottom. Doors shall be hung and trimmed with hardware as specified. All the locks shall be installed at the same height and shall be located at height as directed by the Engineer.

### **Hardware**

Hardware shall be of approved quality and first class finished material. The Contractor shall obtain prior approval from the Engineer for quality, shape and pattern of all the hardware materials by providing samples 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 Employer.

### **Quality Assurance**

#### **a. Tolerances: Doors shall be fabricated to following tolerances**

Size: Plus or minus 1.6 mm overall dimensions

Maximum Warp 3 mm

Squareness Maximum diagonal difference 3 mm ( between length of diagonal measured on face of door from upper right corner to lower left corner and length of diagonal measured from upper left corner to lower right corner.)

### **Submittals**

- a. Provide shop drawings showing door types details and locations, referred to the door type and hardware group shown on door and hardware schedules.
- b. Provide certificates stating that doors were constructed with timber of the species specified having moisture content and meeting equilibrium and relative requirements.
- c. Submit samples of face veneers for selection of colour and pattern.

### **Product Delivery, Storage and Handling**

- a. Keep products dry, stack products off ground on level platforms, fully protected from weather, including direct sunlight.
- b. Identify type, size and location of each door in order to permit installation at correct location.

### **Installation**

- a. Install doors at correct openings and assure smooth swing and proper closer with frames.
- b. Install finishes hardware in accordance with manufacturer directions.

#### **8. DEFECTIVE WORK**

In the event of non-conformance to specification and drawings, the wood works shall be rejected by the Engineers and the Contractor shall remove and replace the rejected work by new work of same specifications.

#### **9. SURFACE PREPARATION**

The surfaces of all wood works shall be prepared in the manner as directed by the Engineer for polishing and painting.

#### **10. MOCK-UP SAMPLE**

After approval of shop drawings and tests etc., the contractor shall submit at his own cost one mock-up sample of each type of wood works complete with all fittings/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.

#### **11. MEASUREMENT AND PAYMENT**

##### **11.1 Measurement**

Measurement and payment for steel doors, windows, rolling shutters and ventilators shall be in accordance with the provisions given hereafter. The quantity to be paid for under this item shall be net openings insq.ft. in the walls where steel doors, rolling shutters, windows and ventilators have been acceptably fixed complete in all respects as per relevant drawings or as directed by the Engineer. Hardware, if provided in the bill of quantities, shall be measured separately and unit of measurement will be as provided in the bill of quantities..

##### **11.2 Basis of Payment**

Payment shall be made for items of works as measured above at the Contract Unit Price for all supply of items and means of fixing, cutting, shaping, priming, painting as necessary and all other operations required for the complete erection and commissioning to the full satisfaction of the Engineer for the item.

### SECTION - 208 ALUMINIUM WORKS

## 1. SCOPE OF WORK

The work under this section of specification includes furnishing all labour, equipment, appliances and materials and performing all operations in carrying out the work of anodized aluminum doors, windows (other than curtain wall type doors and windows) ventilators, louver and fly screen. All related items such as sealants, rubber gasket for glazing, netting, rollers, latches, fastenings, glazing, anchor bolts and all items supplied by other trades and customarily built in and/or installed in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract

## 2. APPLICABLE STANDARDS

Latest editions of following ISO and British Standards are relevant to these Specifications wherever applicable.

### 2.1 ISO (International Organization for Standardization)

1804	Doors	Terminology
6442	Door Leaves	Measurement of defects of general flatness.
6443	Door Leaves	Measurement of dimensions and defects of squareness.
6444	Door Leaves	Test of behavior under humidity variations (successive uniform climates)
6612	Windows & Doors	Wind resistance tests.
6613	Windows & Door	Air permeability test.

### 2.2 BSI (British Standard Institution)

1227	Hinges
4873	Aluminium alloy windows.

## 3. GENERAL

3.1 Aluminium doors and windows shall be of profile, pattern and design shown on drawings and manufactured by reputable manufacturer approved by the Engineer. The contractor shall provide manufacture literature completely describing the product, instructions for installation and maintenance.

**3.2** All the sections used for doors, windows, ventilators & fly screens shall be of best quality aluminium products such as equal and unequal angles, channels, tubes, corrugated strips, mouldings etc., in accordance with International standards conforming to ASTM B 308 & B 221.

**3.3** All doors, windows & ventilators shall be of type and size indicated on drawings and shall conform to the requirements shown and specified herein.

**3.4** Contractor shall arrange tests and analysis if directed by the Engineer of scaled models of each window type at the maker's works or any laboratory specified by the Engineer for the material supplied by him to be tested in the presence of the Engineer's Inspector, to whom test certificates, proof sheets, etc. shall be furnished. The models shall be submitted to the Engineer for approval prior to testing. Nevertheless, neither the fact that the materials have been tested in the presence of the inspector nor that the Engineer may have been furnished with test certificates in lieu of sending an inspector to the works shall affect the liberty of the Engineer to reject, after delivery of materials found not in accordance with these specifications.

**3.5** The contractor shall submit shop drawings which shall show full construction details, quantities, and locations, fastenings and attachment to adjacent construction and materials. Shop drawings shall be submitted at the proper time to allow for checking, revisions, agreement and permit manufacturer's product delivery and start of site work to suit the building programme. The Contractor shall submit representative samples of finished windows, anchoring mechanism, embedded parts, fastenings, glass panes, accessories and other materials for the Engineering approval.

After approval of shop drawings and tests etc, the contractor shall submit at his own cost one mock-up sample of each type of aluminium works complete with glazing, all components assembly method and required fittings and accessories prior to be 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.

Fabricate and assemble all work in the shop of the approved manufacturer to reduce field fabrication to a minimum unless otherwise directed by the Engineer.

**3.6** The glass shall conform to specification laid down under section 'Glazing' and shall be free from all blemishes, bubbles, distortions and other flaws of any kind and shall be properly cut to size as shown on drawings, so as to fit the grooves in door and window members. All the glass shall be best quality of approved manufacture.

**3.7** The structural shape of the Aluminium members shall be of uniform quality, colour and temper, clean, round, commercially straight and free from injurious defects.

**3.8** All doors, windows and ventilators shall be fabricated as a complete unit, fully airtight and watertight, including rubber gasket for glazing, rollers, latch, anodized in specified colour, inclusive of glass sheet, necessary holes for fixing, door locks, door closures and window locking requirements, all as approved by the Engineer.

3.9 Contractor shall, on request, get certificate signed by the manufacturer stating that each lot has been sampled, tested and inspected and has met the requirements in accordance with these specifications, and the same shall be furnished to the Engineer.

#### 4. MATERIAL

##### 4.1 Frames/Shutters

The frames/shutters of anodized aluminum doors, windows, ventilator and louvers shall be formed from rolled, strip or extruded aluminum and be as per drawing. Fastenings bolts and screws shall be made from hardened aluminum.

Fasteners shall be stainless steel of a type selected to prevent galvanic action with the components fastened.

Gaskets shall be vinyl glazing channel gasket to commercial standard CS-230-60.

Hardware shall be manufacturer's standard hardware flush to match door and windows finish

Joint sealant shall be approved elastomer.

The finish shall be in approved colour in accordance with the standards of Aluminium Association.

Minimum coating should not be less than 23-25 micron.

#### 5. WORKMANSHIP

The Contractor shall be responsible for the protection and installation of all items furnished. All items shall be installed plumb and square and shall be solidly anchored in a good workman like manner in accordance with the manufacturer's instruction and as specified herein. The Contractor shall be responsible for the protection of installed items from damage by other trades. All items shall be left in operating, neat and clean condition, free from dirt, finger marks, etc. The Contractor shall be responsible for final cleaning before the final acceptance.

The glass panes shall firmly be secured in the rebates with the rubber gasket. Ensure that the beads and grooves are clean, dry and unobstructed at the time of glazing. The complete unit shall be airtight and watertight on completion. No doors windows ventilator louvers shall be considered complete until and unless the finger prints and other stains and marks have been removed from the surface of glass and aluminium.

#### 6. PRODUCT DELIVERY AND STORAGE

6.1 Deliver doors, windows, ventilator and louvers in a manner preventing damage to units. Store materials off the ground under cover in a manner preventing deterioration or damage.

6.2 All embedded parts and anchor bolts shall be delivered to the site carefully and keeping the fabricated shape and configuration. All these parts shall be suitably marked for identification.

## 7. **ERECTION**

Rawplugs and anchoring bolts shall be embedded into the concrete or block masonry for holding the doors, windows, ventilators and louvers in their correct positions.

Care shall be taken to install the doors and windows, ventilators and louvers in line and plumb & solidly anchored in a workman like manner in accordance with the drawings. Should any scale or scratch appears on the surface of doors, windows, ventilators and louvers the contractor shall at his own expense and at the Engineer's direction have all exposed surfaces cleaned to bare bright specified

All works shall be installed in strict accordance with the manufacturer's instructions.

## 8. **PROTECTION AND CLEANING**

8.1 Temporary protection shall be achieved by applying water soluble protective coating capable of withstanding the action of lime mortar.

8.2 Apply coating in the manufacturer's plant to the exposed surfaces of all components.

8.3 Before application of coating, remove all fabrication compounds, moisture and dirt accumulations.

## 9. **DEFECTIVE WORK**

In the event of non-conformance to specifications and drawings the aluminium work shall be rejected by the Engineer and the Contractor shall remove and replace the rejected works by new work of same specifications.

## 10. **GUARANTEE**

10.1 The manufacturer shall furnish his standard written guarantee against leakage of rain, excessive infiltration of dust and air and all defects in materials and workmanship covering all work under this section.

10.2 Such guarantee shall be in addition to and not in lieu of all other liabilities which manufacturers and the Contractor may have by law or by other provisions of the Contract Documents.

## 11. **MEASUREMENT AND PAYMENT**

### **11.1 Measurement**

Measurement and payment for doors, windows, and ventilators shall be in accordance with the provisions given hereafter.

The quantity to be paid for under this item shall be net openings insq.ft. in the walls where aluminum doors, windows and ventilators have been acceptably fixed complete including glazing, in all respects as per relevant drawings or as directed by the Engineer.

### **11.2 Basis of Payment**

Payment shall be made for the number of sq.ft. of items of works as measured above at the Contract Unit Price per sq.ft. for all supply of items and means of fixing, cutting, shaping, glazing, and all other operations required for the complete erection and commissioning to the full satisfaction of the Engineer for the item:

## **SECTION - 210 CEMENT PLASTER**

### **1. SCOPE OF WORK**

The work under this section of the Specifications consists of furnishing~ all plant, labour, equipment, appliances, and materials and in performing all operations in connection with providing and installation of cement plaster, and specified external rendering complete in strict accordance with this section of the Specifications and the applicable drawings and subject to the terms and conditions of the Contract. The scope of this section of Specification is covered with detailed Specifications as laid down herein.

### **2. APPLICABLE STANDARDS**

Latest editions of following Pakistan, British & ASTM standards are relevant to these specifications wherever applicable.

#### **2.1 Pakistan Standard**

PS 232 Ordinary Portland Cement

#### **2.2 ISO (International Organization for Standardization)**

R 597 Definitions and terminology of cement.

R 679 Method of testing strength of cements, compressive and flexural strength of plastic mortar (Rile - (bureau method).

P 680 Chemical analysis of cement & main constituents of Portland Cement.

R 681 Chemical analysis of cements-mixer Constituents of Portland cement.

R 682 Chemical analysis of cements - determination of sulphur as sulphide.

### **2.3 ASTM (American Society for Testing and Material)**

C 144 Aggregate for Masonry mortar

C 631 Bonding Compounds for interior plastering

### **2.4 BSI (British Standards Institution)**

812 Methods for sampling and testing of mineral aggregates, sands and fillers.

119 Sands for external renderings Internal plastering with lime and Portland cement and floor screeds.

1369 Metal lathing (steel) for plastering.

5262 External rendered finishes.

5492 Internal plastering.

## **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 as shown on the drawings.

**3.2** Plastering shall not commence until all electric conduits, drainage and sanitary pipes, inlets to tanks, brackets, clamps, doors and window 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 work is 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.

**3.3** Sample of materials shall be submitted to the Engineer for his approval prior to use in the works.

#### **4. MATERIAL**

4.1 Cement for plaster shall be Ordinary Portland Cement (BS 12 or PS 232) or Sulphate Resisting Cement (BS 4027 or P.S. 612) as specified and shall conform to requirements specified in the section 'Plain and Reinforced Concrete.

4.2 Sand for plaster shall comply with the requirements of BS 1199, BS 1200 or the Pakistan Standard "Sand for Plaster" as directed by the Engineer.

4.3 Water for plaster shall conform to requirement specified in the section for "Plain and Reinforced Concrete"

4.4 All materials and workmanship for plaster not explained in these Specifications, shall comply with the requirements of relevant BS CP 211 and CP 221 as directed by the Engineer.

4.5 External rendered finishes should comply with appropriate clauses of BS 882.

#### **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 or as directed by the Engineer. Mixing shall be continuous until all ingredients are evenly distributed and thoroughly mixed.

5.2 Only limited water shall be added for proper workability and such quantity of mortar shall be prepared which can be consumed in thirty minutes after preparation. Preparation of mortar in bulk quantity for use during the entire day or for any other time more than that stipulated above is expressly prohibited. Retempering shall not be permitted and all mortar which has begun to stiffen shall be discarded.

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.

5.4 Water Proofing Plaster 3/4" inch (20 mm) thick 1:4 cement sand plaster mixed with approved water proofing agent.

#### **6. PREPARATION OF SURFACE TO BE PLASTERED**

6.1 Concrete surface to be plastered shall be cleaned to remove all grease, form oil and other surface impurities which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface of all concrete ceilings, beams and columns shall be lightly hacked by approved means to give the required key for plastering.

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. Spatter dash of slurry shall be applied on surface to receive plaster and be left to cure for three days.

## **7. APPLICATION OF PLASTER**

7.1 The plaster shall not have wavy surface and shall be perfectly in plumb. The edges and corners shall represent a straight line. The plaster shall be kept wet continuously for at least ten (10) days. No extra payment shall be allowed for jambs, junctions, corners, edges, round surfaces or 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 a 10 ft. (3 meter) straight edge and plumb bob.

7.2 Plaster containing cracks, blisters, pits, discolouration or any defects shall not be acceptable. Any plaster giving hollow sound 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 out and patch all defective work at his own cost. All damaged plaster shall be patched as directed by the Engineer. Patching plaster shall match appearance of and shall be finished level with adjoining plaster.

## **8. CLEANING AND PROTECTION**

8.1 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.

8.2 Prior to plastering all aluminium Windows, finished metals should be covered by sheet of plastic or tarpaulin to protect it from damage.

8.3 Protect finished, plaster from injury by any source. Contractor shall also protect walls, floors and work of other trades from plaster materials.

## **9. TOLERANCES**

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

Maximum permitted tolerances shall not exceed 1/8 inch. (3 mm) in 6 ft. (2 meter) variation from plumb or level in any exposed line or surface and 1/16 inch. (1.5 mm) variation between planes of abutting edges or ends.

## **10. MEASUREMENT & PAYMENT**

### **10.1 Measurement**

Measurement shall be made of cement plastering for the actual area in square foot in accordance with this section of Specification or as directed by the Engineer.

### **10.2 Basis of Payment**

Payment shall be made for the number of square foot of surface area cement plastered at the contract unit price per square foot and shall constitute full compensation for furnishing all materials, equipment and labour including all incidentals necessary to complete the work in strict accordance with this Section of Specification.

## **SECTION - 211**

### **MARBLE WORK**

#### **1. SCOPE OF WORK**

The work under this section of specifications, consists of providing all material, labour, plant, equipment, appliances and performing all operations required for providing and installing marble natural stone slab and tile finishes in floor and special aglow marble stone in floor & skirting, where shown on the drawings, complete in strict accordance with this section of the specification and the applicable Drawings.

#### **2. SUBMITTALS**

Submit three range sample each type of marble showing colour, grade, finishing and texture for approval.

#### **3. DELIVERY, STORAGE AND HANDLING**

Materials shall be protected from damage during loading, shipment, delivery and storage. Non-staining materials for blocking and packing shall be used. Stack marble units at site in accordance with manufacturer's recommendations and as required to prevent staining, scratching, etching or breakage.

#### **4. MATERIALS**

##### **4.1 General**

- a. The marble/stone work of all types should be consistent in type, colour range and texture.
- b. Provide slabs or tiles of specified sizes in floor and wall areas as shown on drawings.
- c. Provide marble /stone of specified thickness. Saw-cut the back surfaces that are meant to be concealed in finished work.
- d. Provide irregular shaped units, staircase units and skirting base units to the profiles of required, with arises sharp true and matched at joints, polish exposed edges.

#### **4.2 Marble/Stone Type**

All marble/stone types are to be selected and approved by the Engineer for quality, colour and texture as:

- a. Marble of local origin, first class quality and high class finish acceptable to the Engineer.
- b. Stone: As approved by the Engineer.

#### **4.3 Beds and Backings**

Where applicable, standard cementations screed and mortar beds and backings, mixed and proportioned by volume shall be as follows:

Grey ordinary

Portland Cement 1 part

Sand: 4 parts

Water: Clean, fresh and free from deleterious substances.

#### **4.4 Adhesives, Grouts and Sealants**

Proprietary adhesives, joint grouts and sealants of approved type as required and recommended by the manufacturer for specific application shall be used. The colour of the joint grout and the sealants shall match with the colour of stone/marble.

### **5. EXECUTION**

#### **5.1 Flooring, Skirting and Stair**

Apply cement slurry coat over surfaces of concrete substrate immediately prior to placing setting bed. Limit area of application to avoid premature drying out. Install setting bed of required thickness and set marble/stone units before initial set occurs. Apply a thin layer of cement paste to bottom of each unit. Set, temperature and level units immediately. Set units in required pattern with uniform joint widths.

Joints as soon as possible after initial set. Force grout into joints, strike flush and tool slightly concave.

Remove mortar and grout from surfaces while still moist and as the work progresses.

Do not permit traffic on finished surface during setting and for a minimum of 24 hours after final pointing of joints.

## **5.2 Repair and Cleaning**

Remove and replace marble/stone units which are broken, chipped, stained or otherwise damaged. Where directed, remove and replace units which do not match adjoining stonework or are not in line and level as shown on Drawings. Provide new matching units, install and point joints to eliminate evidence of replacement. Repoint defective and unsatisfactory joints to provide neat, uniform appearance.

Clean stonework not less than 6 days after completion of work, using clean water and bristle brushes. Do not use wire brushes, acid or caustic type cleaning agents or other cleaning compounds which may be detrimental to the marble/stone finish or joint grout.

## **5.3 Protection**

Provide covers, boards, supports and all other necessary materials to protect finished work from collapse, deterioration, discoloration or damage during installation and until contract completion.

## **5.4 Polishing**

The finished surface shall be provided with two applications of approved wax polish or as approved by Engineer.

## **6. MEASUREMENT & PAYMENT**

### **6.1 Measurement**

Measurement shall be made of marble area in square foot in accordance with this section of Specification or as directed by the Engineer. Earthwork, cement concrete, will be measured separately.

### **6.2 Basis of Payment**

Payment shall be made for the number of square foot of surface area of marble at the contract unit price per square foot and shall constitute full compensation for furnishing cement mortar, marble, grinding, polishing, all materials, equipment and labour including all incidentals necessary to complete the work in strict accordance with this Section of Specification.

## SECTION - 212 PAINTING

### 1. SCOPE OF WORK

The work under this section of the Specifications consists of furnishing all materials, plant, labour, equipment, appliances and performing all operations in connection with surface preparation, mixing, painting concrete works, gates, frames, walls, ceilings and all such surfaces as shown on the Drawings and/or as directed by the Engineer. The scope of this section of specification is covered with detailed specifications as laid down herein.

### 2. APPLICABLE STANDARDS

Latest editions of following British Standards are relevant to these specifications wherever applicable.

#### 2.1 BSI (British Standards Institution)

245 Specification for mineral solvents (white spirits and related hydrocarbon solvents) for paints and other purposes.

2521 Lead-based priming paint for woodwork.

2523 Lead based priming paint for iron and steel.

2569 Sprayed metal coatings.

4800 Paint colours for building purposes.

CP.231 Painting of building.

CP 3012 Cleaning and preparation of metal surfaces.

### 3. GENERAL

3.1 Except as otherwise specified, all painting shall be applied in conformity with BS CP 231 "Painting of Building" as applicable to the work.

3.2 The Contractor shall repair at his own expense all damaged or defective areas of shoppainted metal works and structural steelwork. Metal surfaces against which concrete to be placed will be furnished shop-painted and shall be cleaned prior to being embedded in concrete.

3.3 Except as otherwise specified, all concrete and plastered surfaces are to be painted.

3.4 The Engineer will furnish a schedule of colours for each area and surface. All colours shall be mixed in accordance with the manufacturer's instructions.

3.5 Colours of priming coat and body coat where specified, shall be lighter than those of finish coat. The Engineer shall have unlimited choice of colours.

3.6 Samples of all colours, and finishes shall be prepared in advance of requirement so as not to delay work and shall be submitted to the Engineer for approval before any work is commenced. Any work done without such approval shall be redone to the Engineer's satisfaction, without additional expense to the Employer. Samples of each type of paint shall be on separate 1 ft. x 1 ft. x 1/8 inch tempered hard board panels.

Manufacturer's colour chart shall be submitted for colour specifications and selection.

#### **4. MATERIALS**

4.1 All materials shall be acceptable, proven, first grade products and shall meet or exceed the minimum standards of approved manufacturers.

4.2 Colours shall be pure, non-fading pigments, mildew-proof sun-proof, finely ground in approved medium. Colours used on plaster and concrete surfaces shall be limeproof. All materials shall be subject to the Engineer's approval.

4.3 Approved quality Distemper paint shall be used for painting where specified on the drawings as directed by the Engineer.

4.4 The plastic emulsion/weather shield paint or similar as approved by the Engineer shall be used where specified on the drawing as directed by the Engineer.

4.5 All material shall be delivered to site in their original unbroken containers or packages and bear the manufacturer's name, label, brand and formula and will be mixed and applied in accordance with his directions.

#### **5. DELIVERY STORAGE AND CONTAINER SIZES**

Paints shall be delivered to the site in sealed containers which plainly show the type of paint, colour (formula or specifications number) batch number, quantity, and date of manufacture, name of manufacturer and instructions for use. Pigmented paints shall be supplied in containers not larger than 20 liters. All materials shall be stored under cover in a clean storage space which should be accessible at all times to the Engineer. If storage is allowed inside the building, floors shall be kept clean and free from paint spillage.

#### **6. SURFACE PREPARATION**

6.1 All oil, grease, dirt, dust, loose mill scale and any other foreign substance shall be removed from the surface to be painted, polished and white washed by the use of a solvent and clean wiping material. Following the solvent cleaning, the surfaces shall be cleaned by scrapping, chipping, blasting, wire brushing or other effective means as approved by the Engineer.

**6.2** In the event the surfaces become otherwise contaminated in the interval between cleaning and painting, recleaning will be done by the Contractor at no additional cost.

**6.3** All the surfaces to be painted shall be free from dust, dirt, fungus, lichen, algae etc. Oil paint, varnish and lime wash should always be removed by scraping and washing.

No work in this section shall be allowed until all surfaces or conditions have been inspected and approved by the Engineer.

## **7. APPLICATION**

**7.1** All paint and coating materials shall be in a thoroughly mixed condition at the time of application. All work shall be done in a workman like manner, leaving the finished surface free from drips, ridges, waves, laps, and brush marks. All paints shall be applied under dry and dust free condition unless approved by the Engineer. Paint shall not be applied when the temperature of the metal or of the surrounding air is below 7 degrees centigrade. Surfaces shall be free from moisture at the time of painting.

All primary paint (Alkali Resistance) shall be applied by brushing. The first coat of paint shall be applied immediately after cleaning. When paint is applied by spraying, suitable measures shall be taken to prevent segregation of the paint in the container during painting operation.

Effective means shall be adopted for removing all free oil and moisture from the air supply lines of the spraying equipment.

Each coat of paint shall be allowed to dry or harden thoroughly before the succeeding coat is applied. Surfaces to be painted that will be inaccessible after installation shall be completely painted prior to installation.

Only as much material should be mixed as can be used up in one hour. Over-thinning will not be permitted. After the first coat the surfaces will be soaked evenly four or five times and the second coat shall be applied after leaving for at least overnight.

**7.2** Where shown on Drawings all exterior finishes shall be painted with weather resistant paint in approved colours as per manufacturer's specifications.

**7.3** Plastic emulsion paint of the approved make and shade shall be applied to surfaces as shown on Drawings or as specified by the Engineer..

**7.4** Polyvinyl Distemper of the approved make and shade shall be applied to surfaces as specified.

## **7.5 Polishing**

After fine sanding by a skilled operator, one coat of clear polish should be rubbed in by hand using a cloth or pad, be allowed to dry and buffed up with worn fine sand paper or steel wool to remove raised grain. A second coat of clear polish should then be applied.

## **8. JOB CONDITIONS**

8.1 Observe manufacturer's recommended minimum and maximum temperature but do not apply paint or finish to any surface unless ambient temperature is 10 °C or above and less than 43 °C. Non painting shall be done above 90% relative humidity.

8.2 Adequately protect all finished work.

8.3 Remove and replace all items of finish hardware, device plates, accessories, lighting fixtures or other removable items.

8.4 In no case shall any finish hardware or other finished item that is already fitted into place be painted, unless otherwise specified.

## **9. QUALITY ASSURANCE**

All paint for any one surface shall be top quality, of one manufacturer of the specified. Deep tone accent colours shall be used and the unavailability of final coat colours may be the basis for rejecting materials for any one surface.

## **10. MEASUREMENT AND PAYMENT**

### **10.1 Measurement**

Measurement and payment for painting will be made in accordance with the provisions given hereafter. Measurement will be made for the number of square feet of painted area acceptably completed in all respects as per drawings and in strict accordance with this section of specification or as directed by the Engineer.

### **10.2 Basis of Payment**

Payment will be made for the number of square feet of painted area measured as above at the Contract Unit Price per square feet and shall constitute full compensation for all work and all other incidentals to complete the work.

## **SECTION - 213**

### **DAMP PROOF COURSE**

## **1. SCOPE OF WORK**

The Damp Proof Course shall be horizontal and vertical as shown on the drawings and specified in the Bill of Quantities.

## 2. HORIZONTAL

### In Walls

Unless shown on the plans, the horizontal D.P.C. shall consist of 1-1/2" thick, Class C cement concrete with two intervening layers of polythene sheet and two (2) sand blinded coats of S.I.B. (Specified Industrial Bitumen) grade 10/20.

### Under Floors

Same as in walls except bitumen layers to be laid on 1/2" - 3/4" blinding screed (1:6) to even out surface of Class-E hard core.

## 3. VERTICAL

The vertical D.P.C. shall consist of 3/4" thick 1:3 cement sand mortar with 5% pudlo and two (2) sand blinded coats of hot S.I.B.

## 4. MATERIAL REQUIREMENTS

All materials i.e. cement, sand aggregate, water polythene sheet and bitumen shall conform to the specifications given in respective section.

## 5. CONSTRUCTION REQUIREMENTS

The Contractor shall lay the D.P.C. only when the level, quality of masonry work, etc. is approved.

The concrete work of D.P.C. shall conform to the relevant specifications given in this section for the execution of these items.

Horizontal D.P.C. shall extend to the full width of the wall i.e. up to the external faces. No portion of doors opening, etc. shall be left while laying D.P.C. The period of curing of concrete shall be not less than 72 hours. Every care should be taken that concrete is not left dry during this period. The work of laying Damp Proof Course shall be carried out as follows unless otherwise described in BOQ:-

- a. Placing 1-1/2" thick layer of Class-C cement concrete.
- b. Laying 2 coats of hot bitumen S.I.B. 10/20 grade @ 20 lbs. per sq.ft. (each coat) over entire width and lengths of concrete after the concrete has been properly cured for at least 72 hours, and sand blinding where specified.
- c. Laying of polythene sheet 500 gauge over entire width and length of concrete after the concrete has been treated with 2 coats of hot bitumen.

The application of bitumen coating in case of vertical D.P.C. shall be same as mentioned above.

## **6. MEASUREMENT AND PAYMENT**

### **Measurement**

Measurement and payment for Damp proofing work shall be made in accordance with the provisions of this clause specified hereinafter.

Measurement, will be made per sq.ft of superficial area or surface damp proofed as per this Section of Specification and accepted by the Engineer.

### **Basis of Payment**

Payment will be made for the number of sq.ft of superficial area damp proofed at the Contract Unit Price and will include full compensation for furnishing and placing all materials and for all labour, equipment, tools and incidentals necessary to complete the work prescribed in the Bill of Quantities.

## **SECTION - 215 CEMENT CONCRETE FLOORING**

### **1. SCOPE OF WORK**

The work covered under this Section of specifications consists of furnishing all labour materials and equipments and performing all operations in connection with the carrying out of the work of P.C.C. flooring, including all related items such as wearing surfaces, bases skirting etc., in strict accordance with the requirements of Drawings and schedule of floor finish and subject to the terms and conditions of the Contract Documents.

### **2. GENERAL**

The Contractor shall strictly follow and adhere to written instructions as mentioned on drawings and specifications. Floor finishes shall be laid true to the line and level. Any work covered under this section of the specifications, not conforming to the requirements of the specified quality and workmanship will be rejected and the Contractor shall be required to remove and replace such work as directed at his own cost.

### **3. MATERIAL REQUIREMENTS**

3.1 Cement sand coarse aggregate shall conform to the specification given in Section-I " Materials ".

**5.1 Division Strips:**

Division strips shall be 1½" deep x 5mm thick plate glass or as specified, embedded and fixed with cement mortar in base concrete to a required depth, level, plumb, line, angle, panel, shape to meet the requirements.

**4. BASE**

The base shall be either dry brick ballast or sand or lean concrete Class-E or as specified in BOQ item and as shown on the drawings.

**5. CONSTRUCTION REQUIREMENTS**

**5.2 Preparation of Base**

**a. Floor**

The surface of the base concrete shall 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 shall be thoroughly cleaned, wetted preferably over night, the surplus water removed and a grout of cement and water brushed into the surface just ahead of the application of the topping.

**b. Dado/Skirting**

The plaster on the portion of the wall to be provided with skirting or dado shall be left in a rough state by brooming or by using wire brushes of approved type so as to provide a bond between this base plaster and the dado or skirting. The surface of the wall shall be cleaned of all foreign matter and shall be thoroughly wetted to control the suction. Only so much mix shall be mixed with water that

could be utilized within 30 minutes. This mix of cement sand shall be applied to the wall and trowel led hard to a smooth surface, proper in line both vertical and horizontal. Finishing for the cement sand skirting shall conform to specifications for plaster work " Section 16 ".

**5.3 Panels**

Before laying the cement concrete flooring, the surface of the base shall be divided into panels of required sizes as shown on drawings. Panels shall be made of glass screeds or as specified. The top of the screed shall conform to the specified level of the finished floor surface.

**5.4 Mixing and Placing**

Mixing and placing of concrete shall be in accordance with specification given under heading "Concrete Work"

Concrete may be conveyed in any suitable manner from the place of mixing provided there is no segregation or loss of any ingredients, and provided it is placed in its final position before initial setting takes place, that is within 30 minutes of addition of water to the mix. The concrete will be laid in a manner so as not to cause the aggregate to separate from the mortar. The concrete shall be rammed and thoroughly consolidated until the mortar creams up to the surface.

The concrete will be laid in alternate panels, each panel not exceeding the area, as directed. Dividing Strips of glass as specified shall be provided wherever shown on drawings.

## **6. FINISHING**

Immediately after consolidation, the surface shall be leveled with a wooden trowel. Excessive troweling in the early stage shall be avoided. The surface shall be tested with a straight edge to detect undulations, which, if found, shall be eliminated. The finer stuff in the concrete which has come to the surface with the stroking shall be quickly but carefully smoothed with the steel trowel. When the concrete has hardened sufficiently, troweling shall be done with steel trowel. No dry cement or a mixture of dry cement with sand shall be sprinkled on the surface for hardening the surface.

### **6.1 Concrete Floor (Smooth) with Topping**

Color topping shall consist of a pigment which shall be added to cement on trial basis till the required shade is obtained. Thickness of the colour topping shall be 1/8" thick.

An approved sample specimen of the topping of required shade shall be available at the site before proceeding with the entire work.

After approval of the trial specimen adequate quantity of the mixture of pigment and cement shall be prepared for sufficient work to avoid any variation in shade.

After wooden troweling of the base, topping shall be applied to the specified thickness and spread out evenly by a wooden float, after waiting for a few minutes to bring it to a little drier stage, steel troweling shall be applied with pressure till a smooth finish is achieved.

### **6.2 Concrete Floor (Roughened)**

After the floor surface has been leveled with a wooden trowel, and the concrete has hardened sufficiently it shall be roughened with expanded metal mesh, wire brush or a broom. A sheet of expanded metal mesh shall be pressed evenly on the concrete surface to achieve the required pattern. Rough surface using wire brush or broom shall be achieved by stroking the green concrete surface with smooth and even strokes as per the required pattern.

## 7. **CURING**

Curing shall be done as per specifications given under section "Portland Cement Concrete".

## 8. **MEASUREMENT AND PAYMENT**

### 8.1 **Measurement**

Measurement and payment for flooring will be made in accordance with the provisions given hereafter.. Measurement will be made for the number of square feet of flooring acceptably placed complete in all respects as per drawings and in strict accordance with this section of specification or as directed by the Engineer.

### 8.2 **Basis of Payment**

Payment will be made for the number of square feet of flooring measured as above at the Contract Unit Price per square feet and shall constitute full compensation for all work including cement concrete,, glass strips, and all other incidentals to complete the work.

## **SECTION - 216** **CERAMIC TILE WORK**

### 1. **SCOPE OF WORK**

The work covered under this section comprises of providing and laying best quality local made glazed/matt ceramic tiles of approved size and pattern wherever required or shown on the drawings or mentioned in the Bill of Quantities.

### 2. **MATERIAL REQUIREMENTS**

Except as otherwise specified the following British Standards and Code of Practice shall be applicable to materials and fixing methods for ceramic tile work:-

- British Standard 1281:1966 " Glazed Ceramic Tiles and Tile. Fittings for internal wall "
- British Standard C.P. 212: for fixing methods and workmanship.

### **Joint Filling**

Joint Filler shall be white Portland cement grout which shall bond to dry tile, shall be non-shrinking, stain resistant, permanent in colour, and shall not inhabit fungus and bacterial growth. It shall be odorless and non-toxic, of smooth consistency for easy preparation and

neat, rapid installation, and shall contain non metallic material. Grout shall be water resistant and shall not wash out under water.

### **Adhesives**

Adhesives for ceramic tiling as specified in the British Code of Practice C.P. 212 or Dry Bond Floor and wall thin set mortar as manufactured by Shabbir Tile and Ceramics Limited or equivalent approved.

### **Samples and Tests**

The samples shall be furnished in sizes and colours and adequate in number for testing in an approved laboratory.

### **3. WORKING DRAWINGS**

The Contractor shall prepare working drawings on the basis of working drawings for all the ceramic tile work to be carried out. These drawings will show clearly the sizes, method of fixing, jointing and the anchorage to be used in the process and the Contractor shall get approval in writing well in time before the actual start of the work.

### **4. CONSTRUCTION REQUIREMENTS**

#### **In Cement Sand Mortar**

Surfaces to receive the ceramic tiling shall be clean and free of dirt, dust, oil, grease or other objectionable matter. Setting beds and tile shall be installed with their respective surfaces to true planes, level or pitched to off-sets as required by the drawings, so that the surface of the completed tiling work will be at the elevations and grades shown. Re-tempering of mortar will not be permitted. Tiles shall be laid out from the centre lines of each space outward and adjustments made along walls, partitions and borders, if any, so as to symmetries the pattern with a minimum of cut tiles.

Joint between tiles shall be of uniform width and the same as the tile installed. Fractional changes in dimensions without varying the uniformity of joint widths shall be permitted. Tile shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Cut-tile misfits shall be laid to the straight edges. Straight edges shall be accurately set to the lines established and reset at suitable intervals to keep the joints parallel over the entire area.

Over the existing bed a topping of 1-1/2" thick PCC 1:2:4 shall be laid. Scratch coats for application as foundation coats shall be not less than 5/8" thick and shall be composed by volume of 1 part Grey Portland Cement to 3 parts dry sand, mixed with the minimum amount of water necessary to produce a workable mass. Mortar for scratch coats shall be used within one hour after mixing and re-tempering will not be permitted. Scratch coats shall be applied in sufficient quantity and with sufficient pressure to cover the entire area and to form good keys, shall be deeply scoured or scratched and cross-scratched, shall be protected and kept moist during the curing period. Scratch coats shall be thoroughly damp-cured, and an interval

of not less than 24 nor more than 48 hours shall be permitted between application of scratch coats and application of float coats.

Float coats shall be composed by volume of 1 part Grey Portland cement to 2 parts dry sand, mixed with a minimum amount of water necessary to produce a workable mass. Float coats shall be applied in sufficient quantity to entire area and to form a good key, shall be brought out flush with the temporary screeds or guide strips so placed as to give a true even surface at the proper distance from the finish suitable for reception of tiles.

Joints shall be straight, level perpendicular and of even width throughout. Vertical joints shall be maintained plumb for the entire height of the tile work. Each tile shall be brought to true level and plane by uniformly applied pressure under a straight edge or rubber faced block. Tiles that are out of true plane or misplaced shall be removed and reset. Damaged or defective tile shall be replaced. The tile shall be installed as follows:-

Wall tile shall be set by troweling a skim coat of neat Portland cement on the float coat or by applying a skim coat to the back of each tile unit and immediately floating the tile into place. After tile has set remove mortar using a minimum of water. Replace damage tiles.

After the tiles have been thoroughly set, joints shall be grouted full with a plastic mix of neat, white cement immediately after a suitable area of tile has been set. The joints shall be struck flush and excess mortar shall be cut off and wiped from the mortar joints after grout has been cleaned from the surface shall be roughened at once and filled flush with the tile edge, before the mortar begins to harden. Tile skirting and coves shall be solidly backed with mortar.

#### **In Thin Set Mortar**

Tiles laid in Thin Set Mortar shall be applied as per details shown on drawings and shall consist of a P.C.C. base of specified thickness. Tiles shall be set by troweling a skin coat of Dry Bond Mortar on the base coat and combed with a notched edge of trowel. Back butter each tile unit to ensure 100% mortar coverage and float the tile into place, tapping the tile to ensure maximum bond strength. All other installation requirements shall be as per specifications mentioned above.

### **5. MEASUREMENT AND PAYMENT**

#### **5.1 Measurement**

Measurement and payment for ceramic tile work will be made in accordance with the provisions given hereafter. Measurement will be made for the number of square feet of ceramic tile work acceptably placed complete in all respects as per drawings and in strict accordance with this section of specification or as directed by the Engineer.

## **5.2 Basis of Payment**

Payment will be made for the number of square feet of ceramic tile work as above at the Contract Unit Price per square feet and shall constitute full compensation for all work including material, labour, plant, equipment, and all other incidentals to complete the work.

### **SECTION – 219 ROOFING AND WATER PROOFING**

#### **1. SCOPE OF WORK**

Unless otherwise specified on plans or bill of quantities, the roofing and water proofing shall consist of:

##### **For Flat Roofs**

Unless otherwise shown on the plans/provided in the bill of quantities, providing, laying, grouting and pointing 1st class burnt brick tiles 9"x4-1/2"x1-1/2" in 1:3 cement sand grout over (3") 76 mm (average) thick puddled earth laid to slopes and consolidated. The earth will be laid over water proofing, consisting of sand blinded coat of bitumen over R.C.C. roof, covered over with the one (1) layer of polythene sheet .008" thick over 2 coats of bitumen.

##### **For Sloped Roofs, Vaults and Shades**

Providing, laying, grouting and installing split tiles rough glazed of size indicated on the drawings, over 3/8" thick special Dry Bond Mortar over 1/2" thick Cement Sand base plaster (1:4) over RCC slab.

##### **Over Drains**

2 coats of VANDEX SUPER over drains on sloped roof.

#### **2. MATERIAL REQUIREMENTS**

##### **Brick Tiles**

Brick tiles shall conform to specifications of materials given in respective items of " SectionI Materials ".

Split Tile and Special Dry Bond Mortar - shall conform to specifications given in the relevant Section and as shown on the drawings.

##### **Mud Mortar**

Puddled earth shall be composed of stiff clay to which an equal bulk of chopped rice husk/bhoosa shall be added.

### **3. CONSTRUCTION REQUIREMENTS**

#### **Inspection and Preparation of Roof Surface**

Inspect all surfaces to receive roofing materials and water proofing, ascertain that they are sound, clean, smooth, dry and free of debris, loose material or defects which would have an adverse effect on the roofing application or performance.

#### **Installation of Roofing**

##### **a. Over Flat Roof**

- One Prime coat and two flood coat of SIB 10/20 hot bitumen at the rate of 7 kg per 100 sq.ft. each coat over RCC slab.
- Apply one layer of polythene sheet (500) gauge, laid 3" side laps and 4" end laps staggered with layers bonded together with bitumen, broom sheet to ensure that it is free of wrinkles.
- Earth shall be laid to desired slopes and tiles shall be laid on a mortar bed average thickness 1" to the required slopes as shown on plans. The preparation of mud plaster shall be as follows.
- The clay containing sand not more than 5% shall be laid out in stakes not exceeding 12" height and saturated with water and allowed to stand for not less than 3 days, water being added during this period to ensure complete saturation. The binding material (Bhoosa) shall then be added and the mixture well puddled and left for 2 days or so. It will then be thoroughly mixed to the required consistency of mortar and laid to slope.
- Brick tiles of specified size and first class quality shall be laid wet, grouted and pointed flush in cement sand mortar (1:3). The top surface shall be smooth and accurately level in accordance with the specified slopes. No brick or cracked tile to be used. Special Tiles for sloped roof shall be laid as per details shown on the drawings.

#### **Sloped Roof, Vaults and Shades**

- a. Split tiles rough glazed of size 9-1/2"x2- 1/4"x3/8" shall be laid in position over 3/8" thick special Dry bond mortar over 1/2" cement sand plaster (1:3) over RCC roof slab, vaults, shades. The tiles shall be grouted and flush pointed with special Dry Bond Mortar.
- b. On drains near vaults, shades etc. 2 coats of Vandex Super over RCC slab.

#### **Working Instructions of Applying of Vandex Super**

Vandex Super in powder form shall be distributed over the concrete surface by means of a sieve with a sieve size of 2 mm just prior to troweling the slab. The Vandex layer and the newly Cast Concrete shall be protected according to general description for concrete work. The Contractor shall co-ordinate the application of Vandex Super at the time of pouring and troweling slabs.

**4. CURING**

Tiles, after laying, grouting and flush pointing is completed, shall be kept wet throughout for at least seven days.

**5. PROTECTION**

The Contractor shall take each and every care to maintain the slopes levels and shall protect the work from any damage. The Contractor shall have to remove, replace and rectify such damaged work at his own cost.

**6. MEASUREMENT AND PAYMENT**

**6.1 Method of Measurement**

Measurement and payment for roof insulation shall be made in accordance with the provisions given hereafter. The measurement of the roof insulation shall be made in actual area acceptably laid in square feet complete in all respects as per relevant drawing or as directed by the Engineer.

**6.2 Basis of Payment**

Payment for roof insulation work shall be made for the number of the sq.ft measured of roof insulation provided above at the Contract Unit Price per sq.ft. It includes the cost of bitumen, mud laying, thermopore, laying of tiles & pointing and shall constitute full compensation for providing and furnishing all materials, equipment, labour and all incidentals necessary to complete the work in accordance with the specifications for bill of quantities.

**SECTION – 220**

**APPROVED SOURCES /MANUFACTURERS/BRANDS**

<b>Sr. No.</b>	<b>Description</b>	<b>Materials</b>
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1	Crushed Stone Aggregate	Margalla, subject to approval. For lean concrete, other source subject to approval may be adopted.
2	Reinforcement Steel	Amreli Steels Ltd., Mughal Steel.
3	Sand	Lawrencepur, subject to approval. No other source other than Lawrencepur is acceptable.
4	Bricks	Local brick is not accepted. Outside sources subject to approval will be adopted.
5	Tuff Tiles	Concrete concepts, Tuff tiles private Ltd, Izhar pvt. Ltd., 7,000 PSI crushing strength
6	Pigment	Ultra Chemicals, ABE chemicals, Sika
7	Hardware Stays & Handles(Brass)	Moosa, Pistol, Alfa, Babar
8	Anti Termite	FMC, Kenzo, Global, Jaffer Brothers
9	Construction Chemicals	Ultra Chemicals, ABE chemicals, Sika
10	Ceramic Tiles	Master, Sonex, Stile
11	Paints	ICI, Nippon, Jotun
12	Glass	Ghani, Al-Fateh
13	Aluminium Doors & windows	Chawla, prime, Alco
14	uPVC Doors & windows	Window Tech, Akhtar Associates, Green Heritage, Framez

### 300-PLUMBING

## **SECTION – 301 PLUMBING**

### **1. SCOPE OF WORK**

The work under this section consists of providing all material and equipment and performing all the work necessary for the execution and completion including testing and commissioning of all systems of plumbing works as shown on the Drawings and/or as specified herein and/or as directed by the Engineer. The systems included in plumbing works are as follows:

- Cold and Hot Water Supply
- Sanitary Drainage
- Fire Protection
- Roof Drainage

All the above named systems shall be completed in all respects including extension of these internal systems upto the specified limits outside the building as indicated on the drawings.

### **2. GENERAL**

All the materials and equipment's shall be of the specifications mentioned herein and the Contractor shall submit the sample, necessary catalogues sketches, shop drawings, the name of manufacturer and guarantee if necessary, before installation. The system shall be installed after the approval of the Engineer. All material and equipment shall be new and unused.

Any material or labour which is usually furnished as a part of the specified equipment and which is necessary for its proper completion and best operation shall be furnished as a part of this Contract without any additional cost whether or not shown/described detail on the drawings or described in detail, in the specifications.

Approval of material and equipment by the Engineer shall not absolve the responsibility of furnishing the same of proper size, quantity quality and all performance characteristics to efficiently fulfill the requirements and intent of the Contract Documents.

The Contractor shall be responsible for his work until its completion and final acceptance, and shall replace any of those that may be damaged, lost or stolen without any additional cost.

All openings left in floor for passage of lines of water supply, soil, waste, vent, etc. shall be covered and protected.

All open ends of pipes shall be properly plugged to prevent any foreign material from entering the pipe.

Misuse of plumbing fixtures to be installed under this Contract is prohibited during the currency of the contract.

All metal fixture trimmings shall be thoroughly covered with non corrosive grease which shall be maintained until all work is completed. Upon the completion of work, all fixtures and trimmings shall be thoroughly cleaned, polished and left in first class condition. Before erection, all pipes, valves, fittings, etc. shall be thoroughly cleaned of oil, grease or other material.

All special tools for proper operation and maintenance of the equipment provided under this Contract shall be delivered at no additional cost.

The Contractor shall allow in his bid for cost of all cutting, making holes and subsequent making it good to the desired finish as per approval of the Engineer. No separate payment shall be made for this item.

The Contractor shall allow in his bid for the cost of providing protective painting or coating as specified in the relevant sections and no claim shall be entertained for this item.

All pipes shall be properly installed as shown on the drawings and/or as directed by the Engineer, and shall be as straight as possible forming right angles and parallel lines with the walls and other pipelines. The position, gradients, alignment and inverts shall be as shown on the drawings and/or as directed by the Engineer

The arrangement, positions and connections of pipe fittings and appurtenances shall be as shown on the drawings. Special precautions shall be taken for the installation of concealed pipes as shown on the drawings or as required. When it should be necessary to correct piping so installed the contractor shall be held liable for any injury caused to other works in the correction of piping. The Contractor shall closely coordinate with other works during the entire stage of execution.

A minimum distance between different services shall be maintained as shown on the Drawings and/or as approved by the Engineer.

Pipes should be installed in such a manner that minimum distance should always be maintained between pipe and wall, beams, columns, etc. Pipes shall be supported on hangers and brackets as shown on the drawings or as directed by the Engineer.

Waste-water outlet from each fixture shall be individually trapped.

Each vent terminal shall extend to the outer air and be so installed as to minimize the possibilities of clogging and the return of foul air to the building

When the roughing in is completed, the plumbing system shall be subjected to test prior to concealing the roughing-in, in order to ascertain that all threads and connections are watertight.

Cast Iron soil and drainage fittings for change in direction shall be used as follows:-

Vertical to horizontal: short sweep or long-turn for diameter 3 inches and larger; long sweep or extra- long turn for less than 3 inches. dia.

Horizontal to vertical: quarter bend or short turn.

All fittings with hubs shall be aligned so that the hub faces upstream. No drainage or vent piping shall be drilled.

All exterior openings provided for the passage of piping shall be properly sealed with snugly fitting collars of metal or other approved rodent-proof material securely fastened into plate

Joints at the roof, around vent pipes, shall be made water-tight by the use of lead, copper, galvanized iron, or other approved flashings or flashing material. Exterior wall openings shall be made watertight.

Each length of pipe and each pipe fitting, trap, fixture, and device used in a plumbing system shall have cast, stamped or indelibly marked on it the maker's mark or name, the weight, type, and classes of the product, when such marking is required by the approved standard.

Where different sizes of pipes, or pipes and fittings are to be connected, the proper size enlarger or reducers or reduced fittings shall be used between the two sizes.

Any fitting or connection which has an enlargement, chamber, or recess with a ledge, shoulder, or reduction of pipe area that offers an obstruction to flow through the drain pipe is prohibited.

Each fixture trap shall have a water seal of not less than 2 inches and not more than 4 inches.

Full S, bell, crown vented traps and traps/depending for their seal upon the action of movable parts are prohibited.

No fixture shall be double trapped.

Where fixture comes in contact with wall and floors, the joint shall be watertight.

Piping in ground shall be laid on a firm bed for its entire length.

Piping in the plumbing system shall be installed without undue strains and stresses. Vertical piping shall be securely held to keep the pipe in alignment and carry the weight of the pipe and contents. Horizontal piping shall be supported to keep it in alignment and prevent sagging. Hangers and anchors shall be of metal of sufficient strength to maintain their proportional share of pipe alignments and prevent rattling. Hangers and anchors shall be securely attached to the building under construction. It must be clearly understood that the Contractor shall be fully responsible for hangers and supports and shall obtain prior approval of design as to the shape, material, dimensions, spacing etc.

Piping in concrete or masonry walls or footings shall be placed or installed in sleeves which will be permit access to the piping for repair or replacement. Roof drain leaders installed inside columns shall be permanently, embedded in concrete.

### **3. COLD & HOT WATER PIPES AND PIPE FITTINGS**

#### **Scope of Work**

The work under this section of the specifications consists of providing all plant, equipment, appliances, material and labour for proper supply and installation of G.I pipes and pipe fittings for cold and hot water supply including jointing, clamping, cleaning, painting etc. both above ground and underground and embedded in walls as shown on the drawings or as specified herein.

#### **G.I Cold and Hot Water Pipes & Fittings/P.E./PP Pipes & Fittings**

##### **a. Material**

The galvanized pipes shall be of medium quality shall conform to British Standard Specifications 1387 for "Steel Tubes and Tubulars suitable for screwing to BS 21 pipe threads".

All screwed tubes and sockets shall have BS pipes thread in accordance with 8821. In order to prevent damage to the leading thread, the ends of the sockets shall be chamfered internally.

A complete and uniform adherent coating of zinc will be provided for galvanized pipes.

Every tube shall be tested at the manufacturer's works to a hydraulic test pressure of 4.90 MPa and shall be maintained at the test pressure sufficiently long for proof and inspection.

Tubes which are bundled shall be secured together by rope or soft iron or other suitable material.

The threads of all tubes shall be effectively covered with a good quality grease or other suitable compound, and each tube above 2 inches. nominal bore shall have a protecting ring affixed to the unsocketed screwed end.

All pipe fittings upto 6 inches dia. shall be of malleable cast iron, best quality imported.

##### **b. Installation**

The run and arrangement of all pipes shall be as shown on the drawings and as directed during installation. All vertical pipes shall be erected plumb and shall be parallel to wall and other pipes. All horizontal runs of piping shall be kept in contact with walls if required to change the location etc. during the currency of the work, the Contractor will do so at no additional cost.

Screwed joints in G.I pipes shall be made perfectly tight, with out the use of any filler except approved jointing compound or tape wherever required to make flanged joints they shall conform to BS 10 Table D.

Furnish and install all pipe passing through floors and walls with sleeves of C.I. sheet, 18 gauge, the inside dia. of which shall be at least ½ inches greater than the outside of the pipe passing through it. Sleeves in exterior walls and pits shall have anchor flanges and space between pipe and sleeve shall be caulked and sealed watertight. At waterproof locations, an approved waterproof type pipe sleeve shall be provided.

All embedded cold & hot water supply piping shall be painted with two coats of enamel paint over a coat of red oxide primer and wrapped with approved anticorrosion polyethylene tape.

**c. Pipe Work Supports**

All supports, clips, steel rods and hangers shall be of mild steel painted with two coats of approved metallic zinc primer.

All clips and brackets shall be equipped with 1/3 inches sectional rubber liners.

Pipe work supports shall be installed in order to allow free movement due to expansions and contraction. Supports shall be arranged adjacent to joints, changes of direction and branches.

Each support shall carry the overall weight of pipe work and water to be borne by it. The intervals between pipe supports shall not exceed the following:

..... <b>Maximum Interval between supports (fee)</b> .....				
..... Steel Pipes .....				
Nominal	Horizontal	Horizontal	Vertical dia inch.	Bare
Insulated				
.....				
.....				

Single pipes hung from floor slabs shall be supported on rod hangers. Where two or more pipes are involved a channel or angle from shall be fitted to the underside of slab by two hangers and the pipes shall be supported from the channel iron and by rod hangers and flat iron hands.

All hanger rods shall have double nuts and bevelled washer to allow the hanger rod to swing.

Multiple pipe runs along walls shall be supported on purpose made substantial angle and channel frames securely fixed to the wall, floor and ceiling as necessary. All pipes shall be arranged to slide on the steel supports and U-bolts shall be provided to form a rigid guide. Exposed pipe work shall be supported on channel, angle iron or with U-bolts to form a rigid guide.

All U-bolts, except used as anchors, shall have a pair of nut and washers on each leg with the supporting steel flange clamped tight between the pair of nuts to form a rigid guide and allowing the pipe to slide axially. U-bolts shall be provided on alternate pipe bracket.

Small paperwork running along skirting shall be supported by standard built-in or screw-on type clips.

Pipes shall be individually supported. Pipes shall not hang from other pipes.

Points at which pipes pass through walls, floors, connections to plant, equipment and heat emitters, etc. do not constitute points of supports for the pipes.

Vertical pipes shall be supported at the base or at anchor points to withstand the total weight of the riser. Brackets from risers shall not be used as a means-of support for the riser.

Supports for insulated water pipe work shall be arranged that the supporting steel work does not come into contact with the pipe surface.

#### **d. Testing and Commissioning**

All water distribution system shall be tested whole or in part to 1 ½ times the working pressure. The test pressure will be maintained for two hours and there should be no leakage in the system. Defects revealed by the test shall be repaired and the whole test redone until the system proves to be satisfactory

After the pipes and fixtures have been properly laid and tested, they shall be flushed clean with water and then disinfected with water solution of chlorine of at least 50 ppm strength for a contact period of 6 hours. The system will be finally flushed with clean water.

### **4. SOIL WASTE, VENT & RAIN PIPES & PIPE FITTINGS**

#### **Scope of Work**

The work under this section of the specifications consists of providing all plant, equipment, appliances, material and labour for supply and proper installation of soil, waste, and vent pipes and pipe fittings including, clamping, cleaning, painting etc., as shown on the drawings or as specified herein.

### **Cast Iron Soil, Waste & Rain Water Pipes and Fittings**

#### **a. Material**

The cast iron pipe shall conform to British Standard Specifications No. 416 for "Cast Iron spigot and socket soil, waste rain water and ventilating pipes and fittings" with socket and spigot or hubless ends. Cast iron pipe below ground shall conform to 88. 437 "cast iron spigot and socket drain pipe and fittings" with socket and spigot ends. The joint shall be lead caulked.

Cast iron pipes shall be sand casted and centrifugally (spun) cast as per requirement. The quality of material shall be according to BSS No. 1452 for Grade 10.

The contractor shall supply coated pipes and fittings. The coating composition shall be of tar basis or a mixture of natural bitumen with a suitable hardener and natural asphalt. The coatings shall be smooth, tenacious, sufficiently hard, not to flow when exposed to a temperature of 63 0 C and not so brittle at zero degree centigrade that it chips soft when scribed lightly with the point of a pen knife.

Every pipe shall be tested at the manufacturer's work to a hydraulic test pressure of 0.07 MPa. Every pipe and fitting shall ring clearly when tested for soundness by being struck all over with a light hammer.

#### **b. Installation**

All cast iron soil pipes and fittings shall be installed to the lines and grades shown on the drawings or as directed by the Engineer. When required to be installed above ground floor level, suitable and substantial number of hangers and supports of approved type and make shall be provided. No piping shall be hung from the piping of other systems. Clamps shall be provided on not more than 5 feet centres or a minimum of one hanger per each length of pipe whichever is smaller. Where excessive number of fittings is installed, additional clamps will be provided.

All steel clamps, hangers and support etc. shall be given one coat of red oxide primer and two coats of synthetic enamel paint. All exposed C.I soil/vent pipes shall be painted with two coats of synthetic enamel paint. Materials for painting shall be of product of well known manufacturer. The instructions of the manufacturer regarding all painting work shall strictly be adhered to. Caulked joints for cast iron bell-and-spigot soil pipe shall be firmly packed with oakum or hemp and filled with molten lead not less than 1 inches deep and not to extend more than 1/8 inches below the rim of the hub. Rubber ring joints shall also be allowed. No paint, varnish, or other coatings shall be permitted on the jointing material until after the joint has been tested and approved.

Pipes passing through walls, floors, etc. shall be provided with sleeves of approved design. All vent pipes to be installed in the system shall be provided with approved cowl and with at least 2'-6" rise above the roof.

**c. Testing and Commissioning**

The testing of drainage system shall be done as specified in the section 302 of Testing and Commissioning.

The Contractor shall also be responsible for the repair of this work & other trades work that may be damaged or disturbed by the tests.

Defective work shall be replaced with new work without extra cost to the Employer. Tests shall be repeated until all work is completed for the satisfaction of the Engineer.

**Asbestos Cement Soil, Waste, Ventilation & Rain Water Pipes and Fittings**

**a. Material**

Asbestos Cement non-pressure pipe shall conform to ISO 391: 1982. The pipe shall have socket and spigot end. The fitting to be used with AC pipe shall be of centrifugally spun cast iron, and shall conform to BS-416. Every pipe shall be tested at the manufacturer's work to a hydraulic test pressure of 0.05 mpa. Every pipe and fitting shall ring clearly when tested for soundness when struck by all over with light hammer.

**b. Installation**

All Asbestos Cement pipes and Cast Iron fittings shall be installed to the lines and grades shown on the drawings or as directed by the Engineer. Suitable and substantial number of hangers and supports of approved type and make shall be provided. All exposed Asbestos Cement pipe and fittings shall be painted with two coats of synthetic enamel paint of approved manufacturer. No piping shall be hung from the piping of other systems. Clamps shall be provided on not more than 5 feet centres or a minimum of one hanger per each length of pipe whichever is smaller. Where excessive number of fittings is installed, additional clamps will be provided.

All steel clamps, hangers and support etc. shall be painted with one coat of red oxide primer and two coats of synthetic enamel paint.

Caulked joints of Asbestos Cement bell-and-spigot pipe and fittings shall be firmly packed with oakum or jute rope soaked in plastic bitumen and filled with cement mortar not less than 1" deep.

**c. Testing and Commissioning**

Testing of drainage system shall be done as specified in section 302 of Testing and commissioning.

The Contractor shall also be responsible for the repair of this work & other trades work that may be damaged or disturbed by the tests.

Defective work shall be replaced with new work without extra cost to the Employer. Tests shall be repeated until all works are completed to the satisfaction of the Engineer.

## **5. PLUMBING FIXTURES**

### **Scope of Work**

The work under this section of the specifications consists of providing all material and labour for supply and proper installation of plumbing fixtures of wash basins, kitchen sinks, laboratory sinks, water closets, urinals, etc. along with all their accessories, water inlet Connection, waste outlet connection etc. complete in all respect as specified herein or as shown on the Drawings and/or as directed by the Engineer.

### **Materials and Installation**

#### **a. General Requirements**

Materials shall conform to the latest referenced standard specifications and other provisions stipulated herein and shall be new and unused.

All fixtures shall be of high class quality and finish and shall be of approved manufacture.

Prior to procurement of the materials, the Contractor shall be required to prepare and submit to the Engineer for his approval, a complete schedule of materials to be used in the works together with a list of the names and addresses of the manufacturers and the trade names of the materials. The schedule shall include diagrams; drawings and such other technical data as may be required by the Engineer to satisfy himself as to the suitability, durability, quality and usefulness of the material to be purchased.

Approval of the schedule shall not be construed as authorizing any deviations from the specifications unless the attention of the engineer has been invited to the specific changes. If the material or equipment offered under this provision the opinion of the Engineer, equal to or better than specified, It will be given consideration.

Plumbing fixtures shall have smooth impervious surfaces, be free from defects and concealed fouling surface. They shall be true to line, angles, curves and colour etc. Normally they shall be of local make and of the best quality available, provided

All taps and cocks to be installed with plumbing fixtures shall be chrome plated (CP) and shall be of appropriate class to work without damage or leakage on the specified pressure of potable water system.

When any fixture is provided with an overflow, the waste shall be so arranged that the standing water in the fixture cannot rise in the over flow when the stopper is closed or remain in the overflow when the fixture is empty.

Plumbing fixtures shall be installed in a manner to afford easy access for cleaning. The space between the fixture and the wall shall be closely fitted and pointed so that there is no chance for dirt or vermin to collect.

When practical, all pipes from fixtures shall be run to the nearest wall.

Where fixture comes in contact with wall and floors, the joint shall be watertight.

Wall hung fixtures shall be rigidly supported by metal supporting members so that no strain is transmitted to the connections. Flush tanks and similar appurtenances shall be secured by approved non-corrosive screws or bolts.

Fixtures shall be set level and in proper alignment with reference to adjacent walls. No water closet shall be set closer than 1.25 ft. from its centre to any side wall. No urinal shall be set closer than 1.0 ft. from its centre to any side wall or partition nor closer than 24 inch. centre to centre:

The supply lines or fittings for every plumbing fixture shall be so installed as to prevent backflow.

All cuttings making holes etc and making it good shall be included in the work.

**b. Wash Basins**

Wash basin with or without pedestal shall be of Vitreous China of approved colors, manufacture and of specified size. It shall be installed as a complete unit including 1/2 inch. CP mixer or 1/2 inch. CP pillar cock, as applicable, 1/2 inch. CP tee stop-cocks with wall cups, CP brass chain with 1-1/4 inch. rubber plug, CP brass strainer, heavy cast iron brackets with bolts, screws etc. plastic water inlet connection pipe, CP brass steel waste outlet and/or uPVC waste pipe, joints jointing and sealing material, etc, with all other minor accessories required to complete the job in all respects.

**c. Water Closets (Orissa)**

Squatting (Asian/Orissa) type water closet of Vitreous China shall be of approved color, manufacture and size. It shall be installed as a complete unit including cast iron P-trap, 1/2 inch. CP tee stop cock with wall cups, plastic water inlet connection pipe. Plastic water flush tank with all internal fittings, installed at low level including inter connecting flush piping and sealing material etc. with all other minor accessories.

**d. Water Closets (European Type)**

European type water closet of vitreous China with close coupled flush tank shall be of approved colour, manufacturer & size.

Trap shall be cast integral with pan. The seat shall be of smooth non- combustible non-absorbent materials like Bakulite and of the open front type fixed to the pan with hinges.

The fittings shall also include 1/2 inch. Tee stopcock, with wall cover, plastic water inlet connection pipe nuts bolts etc. required for installation.

**e. Kitchen Sinks**

Kitchen sink shall be stainless steel of approved make single bowl with integral drain board of specified size, It shall be installed as a complete unit with 1/2" dia. cold and hot water CP mixer, CP brass strainer, CP brass waste outlet and uPVC waste pipe, heavy cast iron brackets with bolts screws etc. joints, jointing and sealing material, etc., with all other minor accessories.

**f. Shower**

Shower head shall be local best quality chromium plated adjustable type installed on the wall at suitable height, complete with cold and hot water mixer and all accessories such as chromium plated extension pipe, C.P. brass escoutcheon etc. It shall be mounted on the wall at a suitable height near the shower head complete with all accessories.

**g. Bath Tub**

Bath tub shall be of glass reinforced polyester of approved size colour and design to match with other fixtures as specified, shall be of good quality from approved Manufacture.

It shall be installed as a complete unit including C.P. brass bath shower, C.P. brass mixer, C.P. brass waste with chain, nuts bolts and all other accessories required for installation. The bath tubs shall be installed in locations and positions (on floor slab or sunk) as shown on the drawings having connection with water and waste water pipes.

**h. Testing and Commissioning**

All fixtures shall be tested for soundness, stability or support and satisfactory operation refer to specific section.

**6. MISCELLANEOUS ITEMS**

**Scope of Work**

The work under this section of the specifications consists of providing all material and labour, equipment, appliances etc., for supply and proper installation of miscellaneous plumbing items of valves, cocks, floor traps, floor drain, cleanouts, mirror, electric water cooler, gas water heater, float valve, foot valve, irrigation outlet etc. as specified, herein or as shown on

the drawing or as directed by an engineer. The Contractor shall furnish appropriate catalogues and literature and obtain approval of the Engineer before purchase.

### **Material and Installation**

#### **a. Bronze Valves**

All valves of 100 inch, diameter and smaller shall be of bronze unless otherwise specified conforming to BS 5154 and shall be of appropriate class for the working pressure of the system on which they are installed. Open and shut indicators shall be marked on the spindle. The ends may be screwed or flanged.

#### **b. Taps and Cocks**

All the taps and cocks shall be of brass, gun metal or other equally suitable corrosion resisting alloy conforming to BS 1010 and shall be imported in addition be chrome plated. The nominal size specified shall be the nominal bore of the seating. The area of the waterway throughout the body shall be not less than the area of a circle of diameter equal to the nominal size of tap/cock. Washers for cold water cocks shall be of specially selected leather, rubber asbestos composition or other equally suitable material. Every tap/cock shall be tested, complete with its component parts, to a hydraulic pressure of at least one and half times working pressure. During test it shall neither leak nor sweat.

#### **c. Floor drains**

Floor drains shall be of cast iron or of other anti-corrosive metal. They shall have minimum water seal of 3/4 inch. and shall be provided with removable metal strainers. The traps shall be of self-clearing type. The open area of the strainer shall be at least equal to the cross section area of the drain line to which it connects. Floor drains shall have provision for connection above the Water seal. Floor drain shall be well set in position so that there is no leakage at the joint between trap and the floor.

#### **d. Cleanouts**

Cleanouts shall be of the same nominal size as that of the pipe on which it is installed. Cleanout shall consist of tapped heavy duty cast iron ferrule caulked into cast iron fitting and heavy duty brass tapered even plug. Cleanouts shall be turned up through floors by long sweep fittings, wherever the space so permits. Top finish of cleanout shall be flush with the floor by means of finished metal plate secured in position and screwed firmly to the plug.

Cleanout shall be so installed that there is a clearance of at least 12 inches for pipes less than 3 inches diameter and at least 18 inches for pipes of 3 inches and larger diameter, for the purpose of rodding.

#### **e. Floor Traps**

Floor traps shall be of cast iron or of other non-corrosive metal. They shall have minimum water seal of  $\frac{3}{4}$  inch. and shall be provided with removable nickel bronze strainers. The traps shall be of self-cleaning type. The open area of the strainer shall be greater than the cross-section area of the drain line to which it connects. Floor traps shall be well set in position so that there is no leakage at the joint between trap and the floor.

**f. Float Valve**

Float valve shall be of copper alloy, piston type and conform to BS 1212. Float shall be of copper conforming to BS 1968.

**g. Foot Valve**

Foot valve shall be installed on the suction line of the pumps where required or indicated on the drawing. Foot valve shall be of brass, and shall be provided with integral strainer. Foot valve shall be provided with a spring loaded vertical check disc with gasket for tight shut-off.

**h. Floor Gully**

Floor Gullies shall be of cast iron or of other anticorrosive metal, and provided with removable nickel bronze strainers. The open area of the strainers shall be greater than the cross section area of the drain line to which it connects. Floor gullies shall be well set in position so that there is no leakage at the joint between gully and the floor.

**i. Gully Traps**

Gully traps in block masonry chamber as shown on the drawing shall be provided with a P-trap having 1 inch. inches minimum water seal and a cast iron frame and cover of size 12" x 12" and shall be internally plastered with pudlo as approved by Engineer.

**j. Cowel**

All vent pipe terminating above the building shall be provided with best quality cast iron cowel and a stainless steel clamp for clamping of water proofing membrane as approved by the Engineer.

**k. Orifice Plates**

Where the static pressure at any connection exceeds limits an orifice plates shall be installed prior to the valve to reduce the water flow so that pressure dose not exceed the required limit. The orifice plate shall be constructed of 12mm thick stainless steel plate and shall be installed between two steel flanges. Size of orifice shall be as obtained from the Engineer prior to fabrication.

**7. ROOF DRAINAGE**

### **Roof Drains**

Roof drains shall be of bitumen coated cast iron. They shall have dome shaped strainers extending above the roof surface. Bottom of strainer shall be flush with the roof surface. Strainer shall have an available inlet area, above roof level, of not less than 1-1/2 times the area of the down-pipe to which the drain is connected. The connection between roof and roof drain shall be made watertight by the use of proper flashing material.

### **Rain Water Shoes**

Rain water shoe shall be of bitumen/asphalt coated cast iron, antisplash type to B.S. 416. The grade of shoe shall be same as that for rain water pipe to which it connects. The shoe shall be fixed 12 inches above the surface to which is discharges freely.

## **8. UPVC PIPE & FITTINGS**

### **UPVC Waste and Vent Pipes & Fittings**

Unplasticized PVC pipes for waste and vent shall be non-pressure pipes conforming to BS-4514. Fittings and specials for use with UPVC pipes shall conform to BS-4346 with elastomeric (Rubber ring) or solvent cement joint to BS-4346. Clamps hangers and supports shall be as required for G.I. pipes.

## **SECTION - 302**

### **TESTING AND COMMISSIONING**

#### **1. SCOPE OF WORK**

The work under this section of specifications includes visual inspection, furnishing all plant, labour, equipment, appliances and materials and performing all operations required in connection with testing and commissioning of all water line, drainage system and fixture etc. in parts and as a whole as specified herein or as shown in the Contract Documents or as directed by the Engineer.

#### **2. GENERAL**

The testing shall include a complete visual inspection of the whole plumbing and fire fighting system and verification or performance as stipulated in the material specification and of correct functioning of the electrical and control systems.

All supply documents, operating instructions, acceptance documentation and maintenance regulations shall be checked to ensure that they correspond with equipment described and also all certificates such as that of the inspection authorities, test certificates and data about quality, temperature and pressure shall be submitted.

### **3. FIXTURES AND FITTINGS**

#### **3.1 Test Programme**

The type and the catalogue number of the sanitary fixtures shall be checked.

All equipment in general including the accessories shall be checked for service ability, correct operation and freedom from damage.

The flow and water capacity shall be checked on the full connection of lavatories showers, WCs. etc. and also the draining capacity shall be measured at same the time.

### **4. POTABLE WATER SUPPLY SYSTEMS (HOT & COLD)**

#### **4.1 Test Programme**

The method of laying and sealing the water connection lines to the buildings and through walls shall be checked.

Visual inspections shall be made of the entire network for the water systems with regard to laying, fixing, suspension of pipes and fixtures, particularly the arrangements of the fixed points and the separation of the individual connections in the various parts of the system.

The satisfactory function of all valves, air relief valve check-valves, pressure reducers, thermostats, pumps, etc., shall be checked. The test programme shall also cover:

Checking of type, thickness and professional laying of the piping insulation

Checking number, form and inscription of the equipment labelling.

Checking of all pipe and flanged connections to devices, water-heaters, drainages and vents for symmetry and lack of strain.

Performance of pressure test for the entire network, including fixtures.

#### **4.2 Hydraulic Pressure Test**

On completion of the pipework installation or sections thereof as required, pressure test shall be made before the application of insulation. The pressure tests shall be taken by sectors. All equipment and accessories shall be provided and the Engineer shall be given notice that the work is ready for testing. Tests shall be made by pumping up the system to the required pressure then closing the valves between the pump and the section under test.

The valve shall remain closed for the duration of the test and the pump shall be disconnected. Test pressure, as detailed below shall be applied as detailed for a period of two hours or longer, at the discretion of the Engineer. If at the end of period, there is no drop in pressure and evidence of leak or other faults, the test will be considered Satisfactory. Should any fault be revealed by the test, leaks are to be recorded. Faults shall be made good and the pipework retested as many times as necessary until satisfactory results are obtained.

After all the pipes and fixtures have been properly laid and tested, they shall be flushed clean with water and then disinfected with water solution of chlorine of at least 50 ppm strength for a contact period 6 hours. The system will be finally flushed with clean water.

#### **4.3 Test Pressure and Procedure**

Fill pipes slowly with potable water to exclude all air. Apply test pressure of 1.5 times the maximum working pressure. There must be no measurable loss of pressure for at least 30 minutes.

### **5. DRAINAGE SYSTEMS**

#### **5.1 Test Programme**

Check the piping by means of the separation system, in relation to the specified capacity.

Check each connection for dimension and draining capacity.

Check the drain line for laying, fixing, compliance with specification.

Check the practical arrangement of the fixtures, fixing points, suspensions, cleaning openings, vents, pit covers and ground inlets.

Check all the covers and openings, paying special attention to the separation system for waste/sewage and the stormwater.

Generally provide clean water and apparatus for testing.

#### **5.2 Test Methods**

##### **a. Water Testing**

All the openings in the piping system shall be tightly closed by inserting testing plug. The highest point will be left open to supply water and may be raised if necessary by temporary jointing, develop a minimum static head of 0.5 bar for of water at each section of the system water is filled to the point of overflow and any drop in the level of water will indicate a leak that will be found by impaction. The water level will be checked for no drop for at least 15 to 30 minutes. Higher stacks will be tested in sections, starting from the top section and then connecting top section to next lower section.

**b. Timing**

Testing shall be carried out as soon as practicable after completion of each drainage stack. All concealed work shall be tested before being finally enclosed.

**6. FIRE FIGHTING SYSTEMS**

**6.1 Stand Pipe System**

**Test Programme**

Visual inspections shall be made of the entire network for the stand pipe system with regard to laying, fixing, suspension of pipes, particularly the arrangements of the fixed points and the separation of the individual connections in the various parts of the system.

The satisfactory function of all valves, air relief valve check valves, pressure gauges, shall be checked.

The test programme shall also cover:

Checking number, form and inscription of the labelling.

Performance of pressure test for the entire network.

**6.2 Hydraulic Pressure Test**

As described for potable water supply system

**6.3 Test Pressure and Procedure**

As described for potable water supply system

**SECTION - 303**

**DISINFECTION**

**1. SCOPE OF WORK**

The work under this section of specifications includes furnishing all plant, labour, equipment, appliances and materials and performing all operations required in connection with disinfecting of all potable water lines in parts and as a whole as specified herein or as shown in the Contract Documents or as directed by the Engineer.

**2. DISINFECTION**

After successful completion of pressure tests the entire potable water distribution system in the building shall be thoroughly flushed with water to remove all entrained dirt and mud before disinfection of the system. The disinfecting chemical shall preferably be hypochlorite solution. However, bleaching powder may be used as alternate material with the approval of the Engineer. Use of gaseous chlorine shall not be allowed for disinfection.

The chlorine solution shall be introduced into the system until the system is filled with the solution and all entrapped air is expelled from the system. The solution shall be retained in the system for at least 24 hours.

At the end of the period solution will be tested for chlorine residual which shall not be less than 10 ppm of chlorine through out the system.

The disinfection process shall be repeated if chlorine required is less than 10 ppm at any location of the system.

After successful completion of disinfection the system shall be flushed with potable water until the residual chlorine is reduced to less than 1 ppm.

During disinfection period all the valves and faucets shall be opened and closed several times to ensure that all parts of the valves/faucets are also disinfected.

## **SECTION - 304**

### **VALVE CHAMBERS**

#### **1. SCOPE OF WORK**

The work to be done under this section of specifications includes all plant, labour, equipment, appliances, materials and in performing all operations required in connection with construction of valve chambers including providing and fixing R.C.C/C.I. cover and frame, ladder rungs, etc. complete as specified herein as shown on the drawings, or as directed by the Engineer.

#### **2. APPLICABLE SECTIONS OF SPECIFICATION**

The following specification sections shall be followed for carrying- out civil works associated with the respective sections of 'Civil Works'.

#### **3. CONSTRUCTION**

Chambers shall be of ordinary / sulphate resistant cement, plain/reinforced cement concrete of the sizes, thicknesses, and class of concrete as shown on the drawings. Where soil is alkaline sulphate resistant cement shall be used for concrete work. The work of excavation, backfilling, disposal of surplus/rejected earth, block masonry, plain and reinforced cement concrete, formwork, reinforcement, R.C.C. / C.I cover and frame, ladder rungs etc. are to be done under this section and shall be executed in accordance with the specifications as stated above. The steel frame and ladder rungs shall be well set in place at the time of pouring concrete.

### **SECTION - 305**

#### **CAST IRON COVERS WITH FRAMES**

#### **& LADDER RUNGS**

#### **1. SCOPE OF WORK**

The work to be done under this section of the specifications consist of furnishing all plant, labour, equipment, appliances, material and performing all operations required in connection with supply and proper installation of C.I cover with frame, and ladder rungs, complete as specified herein, as shown on the drawings, or as directed by the Engineer.

#### **2. CAST IRON COVER WITH FRAME**

Cast iron cover and frame shall be of the size and duty as specified on the drawings. The specified size means the clear opening. The cover shall be complete with frame. Top of cover shall be roughened in an approved pattern with lifting arrangement provided. The frame shall be well set in place at the time of pouring of concrete. The cover shall tightly fit in the frame. It shall be airtight and watertight. The duty and weight for 18" x 18" square cover and frame shall be as follows:

##### Class/Duty of Cover and Frame

##### Gross Weight

Light	25 - 30 KG
Medium	45 - 50 KG

#### **3. LADDER RUNGS**

Galvanised mild steel ladder rungs shall be fabricated to the size specified on the drawings or as directed by the Engineer. The galvanised mild steel ladder rungs shall be fitted by approved fittings at locations shown on the drawings or as directed by the Engineer.

## **SECTION - 306**

### **SERVICE CONNECTION**

#### **1. SCOPE OF WORK**

The work to be done under this section of the specifications consists of furnishing all plant, labour, equipment, appliances, materials and in performing all operations required in connection with providing and installing service connection to the pipe line at locations as shown in the Contract Documents or as directed by the Engineer.

#### **2. GENERAL**

Service connection of water shall consist of cast iron saddle clip, gasket, bolts, Polyethylene (PE), G.I or any other pipe specified in the bill of quantities / drawings, pipe up to plug stop cock, complete, inclusive of making connection with water main.

The size of service connection shall be as shown on the layout plan. Service connection pipe shall cross the sewage pipe from above only. In case the distance between the two pipes is less than 1-0", the water pipe will be enclosed in concrete pipe sleeve of a suitable length. Service connection to water main shall be taken from the top of pipe only.

Connection for sewerage will be made with the existing system as shown on the plans or directed by the Engineer.

## **SECTION - 308**

### **CONCRETE PIPES AND PIPE FITTINGS**

#### **1. SCOPE OF WORK**

The work covered by this section of the specifications consists of furnishing all concrete pipes and pipe fittings, plant, labour, equipment, appliances and materials and in performing all operations required for installing the Concrete Pipes in strict accordance with the specifications of this section and applicable drawings and subject to the terms and conditions of the contract.

#### **2. MATERIALS**

### **General**

Materials shall conform to the latest referred standard specifications and other provisions stipulated herein and shall be new and unused. Prior to procurement of the materials, the Contractor shall be required to prepare and submit to the Engineer for his approval a complete schedule of materials to be used in the works together with a list of the names and addresses of the manufacturers and the trade names of the materials. The schedule shall include diagrams, drawings and such other technical data as may be required by the Engineer to satisfy himself as to the suitability, durability, quality and usefulness of the material intended to be purchased.

### **Concrete Pipes and Pipe Fittings**

All concrete pipes and pipe fittings shall conform to ASTM designation C-14 Class 3 or equivalent BS. It must be clearly noted that all concrete pipes and pipe fittings shall be manufactured with sulphate resisting cement.

## **3. LAYING AND INSTALLATION**

### **Transportation**

Pipes shall be handled with special care during transportation to the site of work. Pipes shall be properly secured to minimise their movement. Cranes shall be preferably used for loading and unloading of pipes, Hooks shall be well padded to prevent pipe

### **Storage**

Pipes should be carefully stored to prevent damage, pipes should not rest directly on ground. Solid timbers base should be set on ground for pipe stacking. Pipes should not be stacked so high as to over load the bottom. The height of stack shall be further limited by the head room available for any fitting gear used on site. Pipe sockets should not normally rest on other pipes in the stack. The end pipes in the bottom row should be securely locked; wedges should be firmly anchored to prevent collapse of the stack.

### **Inspection of Pipe before Laying**

Each pipe shall be carefully examined for soundness and cleanliness immediately before laying; any defective and damaged pipe should be rejected and removed from site.

### **Laying**

Laying shall start from down stream. Each length of Concrete Pipe shall be in a straight line and to the true alignment, position, gradient, and the inverts as shown on the Drawings, unless otherwise directed in writing and set out by the Engineer. The Contractor shall check and

satisfy himself as to the correctness of the final gradient, position, and slope of the complete Concrete Pipe before commencing the laying operation.

The Contractor shall maintain the inside of the pipe free from foreign materials and in a clean condition until the work is completed and approved by the Engineer.

Care shall be taken to avoid abrasion of the pipe. The full length of each section of pipe shall rest solidly up on the prepared bed. Pipes that have the alignment, grades or joints disturbed after lying, shall be removed and relaid by the Contractor at his own cost. Pipe shall not be laid in water. The pipes shall be encased in Reinforced Cement Concrete as shown on the drawings.

### **Collar Joint**

The collar joint shall be made in the following manner The collar is slipped over of the end of the pipe already laid. The next pipe is brought forward against the first pipe. The two ends when butted together concentrically shall leave a groove, in between this groove a jute or hemp gasket soaked in neat cement slurry or bitumen compound is caulked in place. The collar is then slipped back over the pipe ends. The remaining annular space between the collar and the outside of the pipe is filled with 1:1 cement sand mortar and Dressed lightly. Every joint is finished off smooth inside and the interior cleared of all dirt, excess cement mortar and superfluous material

## **SECTION - 309**

### **MANHOLES**

#### **1. SCOPE OF WORK**

The work to be done under this section of the specifications includes furnishing all plant, labour, equipment, appliances, material and performing all operations required in connection with construction of manhole, including provision and installation of cast-iron cover and frame, ladder rungs, vent, inlet & outlet fittings etc., complete as specified herein, or as shown on the drawings, or as directed by the Engineer.

#### **2. APPLICABLE SECTIONS OF SPECIFICATIONS**

The following specification sections except for sub-sections regarding measurement and payment shall be followed for carrying-out civil works associated with this section as per respective sections under 'Civil Works'.

#### **3. CONSTRUCTION**

Manholes shall be constructed using ordinary/sulphate resistant cement. The bottom slab and benching shall be of plain cement concrete cast in situ, the walls shall be of block/brick masonry or reinforced cement concrete with internal and external cement plaster and bitumen coating on the out side surface. The top slab shall have opening for cast-iron cover and frame. The work of excavation, backfilling, disposal of surplus/rejected earth, plain and reinforced cement concrete, formwork, reinforcement, benching, pipe connections and provision and installation of cast-iron cover with frame, ladder rungs, vent, inlet & outlet fittings etc. are to be done under this section and shall be executed in accordance with specifications.

**SECTION - 311**  
**APPROVED MANUFACTURERS/BRAND**

Sr. No.	Description	Manufacturer/Brand
1	Polyethylene Pipe & Fittings	Dadex, Hi-tech & Beta
2	G.I. Pipes	IIL, Jamal & Bashir Pipes
3	G.I. Pipes (Specials)	Chinese (Imported)
4	Sluice Valves	Rahman Valves & Scon Valves
5	Gate Valves	Imported or approved equivalent of Anwar & Faisal
6	Glass	Imported of Belgium origin
7	Stainless Steel Sink	Atlas, Super Asia, Master.
8	Cast Iron Pipe and Fitting, Fixtures	Alpine, CME, Teepu, NPC, SPUN (Soil & Waste). BKM, C.I. Engineering (Rain Water & Vent pipe)
9	Asbestos Pipe	Dadex (Rain water & Vent Pipe)
10	uPVC Pipes & Fittings	Dadex, Beta & Popular
11	RCC Pipes	Shalimar, others manufactured as per ASTM C76/BS
12	Sanitary Fixtures	ICL-Bosch & Porta
13	Flushing Tank	Prime, Faisal, Master
14	Sanitary Fitting	Faisal, Master & Sonex

**SECTION – 401 GENERAL****1. SCOPE OF WORK**

The Work consists of furnishing all tools, plants, labour, materials and equipment and performing the internal and external electrical Works comprising of:

- Light and Power Wiring
- Fans and Fixtures ☐ Wires and Cables ☐ L.T. Switchgear.
- Distribution Fuse gear
- Earthing System ☐ External Lighting

The Work shall be carried out in strict accordance with the Conditions of Contract, Special Conditions, Drawings, Technical Specifications and as per items of Bill of Quantities and including the responsibility of all related works necessary for their proper functioning, testing, commissioning and satisfactory operation and performance including maintenance for the period specified elsewhere. The Contractor shall provide for all required technical and non-technical personnel, skilled and non-skilled labour, construction equipment, transportation etc. as required for the completion of Work in strict according with the Technical Specifications laid herein-after.

**2. PREQUALIFICATION**

The Electrification Work shall be carried out only by a licensed Contractor authorized to undertake such work under the provision of Electricity Act 1910, and the Electricity Rules, 1937, as adopted and modified by the Government of Pakistan.

**3. QUALIFICATION**

A licensed Electrical Contractor should have the following qualifications:-

- Must have in his employment a competent graduate Electrical Engineer registered with Pakistan Engineering Council, Islamabad.
- Must possess a valid Electrical Contractor's License issued by the Electric Inspector of the region where the site is situated.
- Must have in its employment an Electrical Supervisor having certificate of competency who will exclusively supervise this Work.
- Must have necessary tools, plant and instruments. ☐ Must have adequate experience of similar works.

If a Contractor does not possess the above qualifications he shall be allowed to sublet the Work to a competent Sub-Contractor provided an application for his pre-qualification is made to the Engineer for his approval. Decision of the Engineer in this case shall be binding on the Contractor,

#### **4. RULES AND REGULATIONS**

The installation in general shall be carried out in conformity with the Electricity Rules, 1937, and the latest edition of the Regulations for the Electrical Equipment of Buildings issued by the Institution of Electrical Engineers London (I.E.E.). However, in case of conflict between these Specifications and the I.E.E. Regulations, these Specifications shall be followed.

#### **5. STANDARDS**

The latest relevant British Specifications and Codes, Pakistan Standard Specifications, VDE, I.E.C. and I.E.E. recommendations shall be applicable and be followed for the equipment specified herein.

#### **6. CLIMATIC CONDITIONS**

All equipment supplied shall withstand, without developing any defect, the following climatic conditions:-

Maximum Ambient Temperature	=	113° F or 45° C
Minimum ambient Temperature	=	28° F or (-) 2.2°C
Maximum Humidity	=	90%

#### **7. SPECIFICATIONS**

The Contractor shall furnish all material and equipment at site, conforming fully to the Specifications given herein and to the accepted standards as laid down by British Standards, the Institution of Electrical Engineers, London, and the Pakistan Standard Institution. It is not the intent of these Specifications to include all details of design and construction of various material and equipment to be supplied under this Contract. The Contractor shall supply and install all material and equipment specified herein and all installation and small material such as nuts, bolts, washers, shims angles, leveling material, insulation, tape, solder, etc. and all such other material whether specified herein or otherwise required for complete installation as intended by the Specifications.

All material and equipment supplied by the Contractor shall be new and, in all respects, conform to the high standard of engineering design and workmanship, perform and function as herein specified and fully meet the quality level and ruggedness requirement of the Specifications. All material and equipment which have to be supplied and installed by the Contractor shall be passed/approved by the Engineer; even if the same is exactly in accordance with the Bill of Quantities and drawings.

#### **8. SUBMITTAL**

The Contractor, after the award of Work, shall submit for approval of the Engineer all drawings and cuts of equipment, appliances, fixtures and accessories that are to be furnished under the contract. After final approval of a sufficient number of copies as desired shall be furnished for distribution. Cuts, catalogues and

drawings shall be clearly marked to indicate, the items furnished. Cuts of all fixtures, and not a few, shall be submitted.

#### **9. APPROVAL OF DRAWINGS AND DATA**

The Contractor shall provide detailed electrical drawings, wiring diagrams, foundation details, etc. for all electrical switch gear, fuse gear and all other systems etc. for the Engineer's review and approval. Three sets of equipment drawings shall be provided for obtaining approval.

The manufacture of electrical equipment shall be started only after the above mentioned drawings and data are approved.

The time required for review and approval shall be considered included in the total time of completion of job.

#### **10. DRAWINGS & DATA**

Three sets of drawings and data for each equipment shall be furnished by the Contractor for the Engineer's approval before commencement of fabrication and manufacture. The drawings to be supplied by the Contractor shall be as follows :-

Structural Drawings showing:-

- Arrangements
- Dimensional Plans, elevations and front view
- Foundation Plan, anchor bolt locations
- Buss bar locations and configurations
- Incoming and outgoing cable termining positions
- Terminal block locations ☐ Earthing arrangement.

Electrical Drawings showing: -

- One-Line diagram
- Detailed wiring diagram
- All interconnections
- Instrument transformers
- Relays, their locations and internal wiring diagrams
- Other electrical devices including meters instruments and their wiring diagram ☐Signal and alarm circuits

#### **11. SHOP DRAWINGS**

The design drawings do not show conduit routes and depict only the position of various fixtures and outlets. All the planning for the conduit routes shall be carried out, well in advance of the actual execution of work, by the Contractor to the satisfaction of the Engineer. For this purpose the Contractor shall prepare shop drawings and obtain prior approval of the Engineer. Three prints of each shop drawings shall be submitted for obtaining approval.

No piece of Work shall be allowed to be executed at site without the availability of these approved shop drawings. These shop drawings shall clearly depict the load balancing chart of each Distribution Board. Time required for the preparation and approval of shop drawings shall be considered to have been included in the total time allowed for the completion of the Work.

#### **12. SETTING OUT OF WORK**

The Contractor shall set out the Work himself and if any discrepancy is found, he shall report the matter to the Engineer and shall act as directed. If any defective or modified setting out is carried out by the Contractor on his own, he shall rectify or make it good at his own cost.

#### **13. PROGRAMMING**

The Contractor shall keep pace with the Work of the Civil Contractor and any other Specialist contractor. The Engineer shall be kept informed about the programme and the progress of Work so that there is no hindrance in the execution of Work at site.

#### **14. PROTECTION**

The Contractor shall take care not to damage the structure, material, equipment and property belonging to and/or installed by other Contractors during execution of Work and shall repair and make good all losses at his own cost, if found guilty in the opinion of the Engineer.

#### **15. CHANGE OF SPECIFICATIONS**

No change in Specification of the equipment/material will be allowed at any stage, except with the prior approval of the Engineer before the opening of Tenders.

#### **16. PURCHASE OF EQUIPMENT/MATERIAL**

All the equipment and material e.g. transformers, switch gear, fuse gear, cables, conduits, light fixtures and fans will be purchased direct from the manufacturer/authorized dealer to ensure the use of genuine material. Manufacturer's certificate and copies of delivery challans for all such material will be produced as and when desired.

#### **17. MANUFACTURERS AND BRANDS**

Where brands and names of Sub-Station equipment or any other system are specified by name, alternative can be offered provided these are equal in quality to those specified. Satisfaction of the Engineer in this respect shall be essential and prior approval for such deviation shall have to be obtained before submission of Tenders. However all equipment for any one substation or system shall be from one manufacturer only.

#### **18. FACTORY TESTS**

All routine type tests on switch gear, fuse gear, and other equipment shall be performed at the manufacturer's factory in the presence of the Engineer. The Contractor shall inform the Engineer about the date and time of tests on each equipment at least two weeks in advance. All test results shall be supplied in

triplicate for the Engineer's record. The witnessing of tests by the Engineer shall not absolve the Contractor of his responsibility for the proper functioning of the equipment, and for furnishing the guarantee.

**19. OWNER'S SUPPLIED MATERIAL**

Material and equipment if supplied by the Owner shall be made available at site store to the Contractor for installation. Any lead and lift upto and within the site of Work shall be at the cost and responsibility of the Contractor. The Contractor shall ensure safe handling and proper protection after the material and equipment are issued to him at site store and shall provide and maintain required plant and equipment for handling, proper protection and installation at his own cost.

**20. SPARE PARTS LIST**

A list of spare parts required for one year's operation of each equipment where deemed necessary together with unit price of each part, shall be supplied by the Contractor.

**21. GUARANTEE**

The Contractor shall furnish written guarantee in triplicate of the manufacturer for successful performance of each equipment. Such guarantee shall be for replacement which may be found defective in material or workmanship. The guarantee shall cover a minimum period of 12 months effective from the date of completion certificate.

**22. AS-BUILT DRAWINGS**

The Contractor shall, during the progress of work keep a careful record of all changes and revisions where the actual installation differs from that shown on shop drawings. These changes and revisions shall be accurately carried out on the shop drawings and submitted to the Engineer for approval. After approval these drawings shall become the property of the Owner. These updated and approved shop drawings depicting clearly all changes and revisions at site shall be called As-Built Drawings. Reproducible tracings with two sets of prints of all these As-Built Drawings shall be handed over to the Engineer. Final payment will be withheld until the receipt of the approved As-Built Drawings.

**23. TEST REPORTS**

The Contractor shall be responsible for submitting the test reports/certificates and get the installation inspected and passed by the Regional Electric Inspector.

**24. WAPDA REQUIREMENT**

The Contractor on behalf of the Owner shall submit application for Electrical Connection, liaise with WAPDA and carry out necessary formalities and shall be responsible for obtaining the required electrical load/extension in load. Any special requirement of WAPDA shall be complied with by the Contractor. The Owner shall arrange to deposit all amounts, on demand, to WAPDA for providing service connection and security deposits thereof.

**SECTION – 402**  
**DISTRIBUTION BOARDS**

**1. GENERAL**

The distribution boards shall be either free standing, cubicle type or wall mounting type suitable for surface and/or recessed mounting. Each distribution board (d.b.) shall be tropical in design, fully dust and vermin proof and liquid repellent. The cabinet housing the main components shall be fabricated from mild steel sheets 16 SWG thick and reinforced with structural steel members welded to it. Front access, mechanically locked and hinged doors, fully gasketed, having one or two leafs depending upon the size of the cabinet shall be provided on each Cabinet. All openable parts shall be provided with gaskets or lining and screwed to the main body with chromium plated screws. The cabinets after fabrication shall be thoroughly cleaned completely derusted and degreased before applying one coat of zinc or lead- based primer and then two coats of top quality synthetic emulsion or stove enamel paint in battleship grey colour. All exposed parts of the dbs shall be covered with 5 mm thick Bakelite sheet. A load distribution chart shall be provided in each db showing the areas fed by each circuit and a suitably sized pocket inside the front door shall be provided for the purpose. Each db shall be delivered complete with all instruments accessories, rating plates, designations, as approved by the Engineer.

Suitable cable entry glands shall be provided as required for floor mounted boards on the incoming cables but for outgoing cables and/or wall mounted boards exact number of conduit entry holes as are required shall be provided with male brass bushes. The bushes shall be tin plated and fully shrouded or housed in gasketed compartments.

**2. COMPONENTS**

The Main components e.g.Moulded case circuit breakers, load break switches, HRC fuses and instruments that are required for db's as shown on drawings and as described in schedule of quantities shall be the same as described in relevant section. However miniature circuit breakers (MCBs) used in db's are briefly described hereunder:-

**3. MCBS**

The incoming shall have triple pole mcb's suitable for use on 415V 50 Hz, AC and the outgoing mcbs shall be single pole or single phase for use on 220V, 50Hz, AC. The ratings are as shown in drawings and/or described in the Schedule of Quantities.

The mcbs shall be moulded case type having hydraulic magnetic short circuit releases, contacts, operating mechanism and arcing chambers.

The mcbs shall be manufactured and tested to BSS 3871/1966, and shall have a rupturing capacity of 7.5 KA. The final circuit mcb, on the outgoing, shall however be rated 5KA. The mcb's manufactured by Terasaki Japan or Fuji Japan or Marlin & Gerin France or Mitsubishi Japan or approved equivalent are acceptable. The Distribution Boards shall be manufactured by as approved manufacturer.

#### **4. INSTALLATION INSTRUCTIONS**

All labour, equipment, tools, plant and accessories required to complete the installation shall be provided by the Contractor. The distribution board shall be fixed as required in perfect line and plumb. All incoming and outgoing cables shall be terminated properly. All earth terminations shall be made on the neutral block.

#### **5. TESTING**

All dbs shall be tested at manufacturer's works and tests shall be witnessed by the Engineer with out incurring any additional expense to the Owner.

#### **6. MEASUREMENT**

Each distribution board for the purpose of measurement shall be treated as a lump sum job.

### **SECTION – 403 LIGHT FIXTURES**

#### **1. SCOPE OF WORK**

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories of the complete Light fixtures as specified herein and/or shown on the drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at Site with other services for exact locations and positions of the light fixtures.

The lighting fixtures with accessories shall also comply with the General Specifications for Electrical Works, Section-401 and with other relevant provisions of the Tender Document.

#### **2. GENERAL**

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

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

equivalent. Approved equivalent against those specified will be accepted if the specified one is/will not be available. For any substitution the Engineer's approval is necessary.

All fixtures shall be finished in standard color schemes as mentioned in the manufacturer's catalogue for respective fixtures, unless specifically stated in the Specifications, Drawings or Bill of Quantities or directed by the Engineer.

Normally the light fixture are not part of this contract. However, only the bulb-holder shall be installed using the brass socket for the incandescent lamp.

### **3. APPLICABLE STANDARDS/CODES**

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

IEC 81 & BS1853	Tubular fluorescent lamps
IEC 82 & BS 2818	Ballast for tubular fluorescent lamps
IEC 155 & BS 3772	Starters for fluorescent lamps
IEC 400	Lamp holders and starter holders for fluorescent lamps
IEC 566 BS 3677 3767/4017	Capacitors for use in TL, HP mercury and LP sodium vapour discharge lamp circuits
IEC 598	Luminaries

### **4. MATERIAL**

#### **4.1 Fluorescent Light Fixtures**

The fluorescent light fixtures shall have lamps and ballasts of proper rating as shown on the drawings. Each lamp shall be provided with independent ballast.

The fluorescent Lamp shall be tubular, 1224/610mm long, for 36/18 watts respectively as specified. The fluorescent colour shall be cool daylight characteristics with an average output of 2500 lumens ( $\pm 5\%$ ) for 36 watts and 1030 lumens (5%) for 18 watts after 100 burning hours. The ballast shall be polyester filled type, totally enclosed and suitable to operate upto 250 VAC. The power loss shall not be more than 9 watts for 40/36 watts ballast. A wiring diagram, wattage, voltage and current figures shall be printed on the body of the ballast.

The lamp holders shall be rotary lock-in type. The starters shall be glow type with radio interference suppressor/by-pass capacitor. The internal wiring of the fluorescent light fixtures shall be done with heat resistant wires at the manufacturer's factory. All light fixtures shall be provided with power factor improvement capacitor to give a minimum power factor of 0.90. Connectors suitable for connecting 2.5 sq.mm cable conductors shall be provided for supply connections.

The body of the fluorescent light fixtures shall be minimum 24 SWG sheet steel, derusted, degreased, finished in heat resistant paint, stove enamelled. Appropriate size bushed wire entry holes, fixing holes, and earth terminal shall be provided.

The light fixtures shall be furnished with Perspex diffusing panels "040 opal acrylic" (minimum sheet thickness 3mm), polystyrene louvers or metal grid louvers or mirror optic reflectors, etc. as specified on the drawings or in bill of quantities. The louvers shall be secured firmly and in level. The polystyrene, louvers shall be white Egg Crate or as approved by the Engineer. The louvers shall be in one section and not in pieces. An earth terminal for connection to 2.5 sq.mm cable conductor shall be provided.

The design of light fixture for recess mounting shall be coordinated with the design of false ceiling prior to commencement of manufacture. Shop drawings shall be submitted for approval of Engineer.

#### **4.2 Incandescent Light Fixtures**

The incandescent light fixtures shall be as stated on drawings and bill of quantities. The light fixture shall be finished in standard colours unless otherwise stated on drawings or directed by Engineer. All incandescent light fixtures shall be of international standard and quality. The type of fixtures with manufacturer 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.

The lamps, for incandescent light fixtures shall be GLS lamps and shall be supplied and installed according to the wattage as indicated on drawings.

Weather proof bulkhead incandescent light fixture shall comprise of cast aluminum body and gasketed clear glass cover secured to the body by means of wing nuts/screws to give a weather-proof and water tight fit. The gasket shall be weather resistance type. A G.I. wire guard shall be provided on the glass cover. The lamp holder shall be of bi-pin brass having porcelain outer ring.

The glass shade of the light fixtures shall be opal white or clear 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 bill of quantities. The glass shall be opal white or clear as furnished by the manufacturer with the light fixture unless specified.

### **5 LIGHT FIXTURE INSTALLATION**

#### **5.1 General**

The mounting heights of light fixtures are indicated on the drawings, and position of fixtures are according to the mentioned scale.

The Contractor must ensure that the light fixtures are installed uniformly with respect to the dimensions of the area. Any modifications due to site conditions may be made with the approval of Engineer. All fixtures shall be carefully aligned before fixing in position.

The wiring between ceiling rose or terminal box and the fixture shall be carried out with 3-core 0.75 sq.mm and 1 sq.mm flexible copper conductor PVC/PVC cable respectively for circuits protected by 10 amps and 15/20 amps mcbs. The wiring inside light fixture body shall be done with heat resistant cables or PVC insulated cable in heat, resistant sleeves as approved by the Engineer.

Glasses, shades, reflectors, diffusers, etc., must be in a clear condition after installation. All light fixtures shall be earthed by an earth wire connected to the earth terminal in the fitting.

## **5.2 Fluorescent Light Fixtures**

The fluorescent light fixtures on the surface of ceiling shall be installed with the back of the body flush with the ceiling surface and in a manner so as to facilitate wiring. Nylon plugs and galvanized steel bolts or screws shall be used for fixing the light fixture to the ceiling. For light fixtures installation on false ceiling the installation method/detail shall be co-ordinated with ceiling design and submitted for approval of Engineer. Care shall be taken to prevent the weight of the fixture from being transferred to the false ceiling.

Pendant light fixtures shall have two holes in the top of each casing for supporting to the ceiling by a 3/4" dia. galvanized pipe or any other standard method as approved by the Engineer. Wiring from ceiling rose to the fixture shall be installed through the pipe. Proper arrangements such as long threads with check nuts, etc. for minor adjustment in the mounting heights of the fixtures shall also be provided.

## **5.3 Incandescent Light Fixtures**

The incandescent light fixture shall be installed on the surface of ceiling or wall by means of nylon plugs and galvanized steel screws, such that their back finish flush with the surface for exposed conduits and flush with outlet box for concealed conduit system. Wherever convenient, screws for fixing light fixtures shall be screwed into the holes of the outlet box. The light on false ceiling shall be installed in a manner as described for fluorescent light fixture.

**SECTION – 404**  
**WIRING ACCESSORIES**

**1. SCOPE OF WORK**

The work under this Section consists of supplying, installing, and commissioning of all material and services of the complete switches switch sockets, etc., as specified herein, as shown on the Tender Drawings and explained 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 location and position of all electrical equipment's.

The wiring accessories shall also comply with the General Specifications for electrical works and with other relevant provisions of the Tender Documents.

**2. GENERAL**

The locations of the wiring accessories such as sockets, switches etc. are tentatively shown on the drawings. The Contractor shall ensure the exact positions and locations of wiring accessories in coordination with other services drawings, as per site requirements and as directed by the Engineer. The Contractor shall be responsible for proper functioning of wiring accessories after installation and commissioning.

**3. APPLICABLE STANDARDS/CODES**

The latest edition of following standards & codes shall be applicable for the materials specified within the scope of this section:

BS 3676	switches for domestic and similar purposes.
BS 2135	Capacitors for radio Interference suppression.
BS 67	Ceiling roses.
BS 11 5	3 pin plugs, socket outlets and socket outlet adapter
PS 116	Two and three terminal ceiling roses

**4. MATERIAL**

**Switches - Indoor Type**

Switches for controlling light and fan points shall be single pole, rated for 10 Amps, 250 volts AC. The body of the switches shall be of bakelite with white face plate suitable for flush mounting on a sheet steel outlet box. The switches shall be piano type having silver tipped contacts and shall operate with snap action.

Unless otherwise specified wherever switches control only the light points, these shall be plate type gang switches installed on common outlet boxes.

Where specified metal front plates shall be used with single grid type switches. The plate shall be finished in specified colour or as otherwise directed by the Engineer. The bell push switches shall be spring loaded type with the identification symbol embossed on it. Two way switches shall be used to control lights from two different locations as shown on the drawings.

The switches shall be manufactured by Switchkid, Busch or approved equivalent.

### **Switch-Socket Units**

Switch socket units shall be combined 2 and 3 pin 5 Amp or 3 pin 15 Amp 250 volt AC, moulded type with switch and socket on white face plate conforming to the requirements stated above for switches Indoor type. The outlets shall be heavy duty type suitable for mounting on sheet steel outlet box. The 3 pin 15 amps sockets shall have shrouded live contacts and designed such that the earth pin of plug is engaged to socket earth before making of live contacts.

Where metal plate switches are installed, the switch socket units shall also be provided with front plate of similar design.

### **Sheet Steel Box**

The sheet steel boxes for installation of switches, fan regulators, dimmers and socket outlets shall be made of 16 SWG sheet steel having appropriate dimensions. The box shall have suitable arrangement for receiving the conduit(s). An earth terminal shall be provided for connecting atleast three earth wires of 4-sq.mm size.

## **SECTION – 405 CONDUITS AND PIPES**

### **SCOPE OF WORK**

The work under this section consists of supplying, installing and commissioning of all material and services of the complete Conduits and Pipes as specified herein and/or shown on Tender Drawings and stated 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.

The conduits and pipes with accessories shall also comply with the General Specifications for Electrical Works, Section-401 and with other relevant provisions of the Tender Document.

## 1. GENERAL

The extent of works shown on the drawing does not indicate the exact position of conduits and pipes. The Contractor shall ensure exact location and route of conduit and pipes in coordination with other services drawings, as per site requirements and as directed by the Engineer.

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

## 2. APPLICABLE STANDARD/CODES-

The latest edition of the following standards and codes shall be applicable for the materials specified within the scope of this section:

BS 31	- Steel conduits and accessories.
BS 4607	- PVC conduits and accessories.
BS 3595	- PVC Pipes and accessories.
BS 1378	- Galvanized Iron pipes & accessories.

## 3. MATERIAL

### PVC Conduits and Accessories

The PVC conduits and accessories for lighting and power circuits shall be furnished by the Contractor as shown in the drawings or given in BQQ. The PVC bends shall have enlarged ends to receive conduit without any reduction in the internal diameter at joint. Manufactured smooth bends shall be used where conduit changes direction. Bending of conduits by heating or otherwise will be allowed in special situations only, for which the consent of the Engineer shall be required. The use of sharp 90 degree bends and tees will not be allowed for concealed wiring.

The round PVC junction boxes for ceiling light or fan points shall have minimum dimensions of 63 mm diameter and depth. The junction boxes for wall light points shall have minimum dimensions of 63 mm diameter and 38 mm deep. Round junction boxes shall be provided with one piece PVC cover plate fixed to the box by means of brass screws.

The PVC conduits and accessories shall be from approved manufacturers.

### Inspection and Adaptable Boxes

Inspection/Pull boxes and adaptable boxes shall be provided in conduit runs wherever required to facilitate pulling operation. The drawings are diagrammatic and do not indicate the position and spacing of inspection/pull boxes or adaptable boxes. However, these shall meet the following requirements:

### Inspection/Pull Boxes

The rectangular inspection/pull boxes shall be made of 16 SWG heavy gauge sheet steel of suitable design to receive conduits. The box shall be painted inside and outside with black enamel paint over a base coat of red oxide primer paint. The minimum length of the box shall not be less than four times the cable manufacturer recommended bending radius of cable. All concealed type boxes shall have a white plastic sheet of appropriate size fixed to the box by means of galvanized screws.

If the spacing between the end points of conduit run with respect to bends exceeds the following, an inspection/pull box of suitable size according to the number and size of cables and as approved by the Engineer shall be provided:

Straight run without bend	Max. spacing 30 metres
Run with one 90 bend	Max. spacing 20 metres
Run with two 90 bends	Max. spacing 15 metres

#### **Adaptable Boxes:**

Adaptable boxes shall also be made of 16 SWG sheet steel and painted and finished to the same quality as the Lighting distribution boards. The adaptable box shall preferably be fixed adjacent to the DB and have suitable dimensions to match the installation with DB. However, in any case, the depth of adaptable box shall be according to number & size of cables & conduits and shall not be less than the following:

- Conduits upto 25 mm dia. Min. depth = 50 mm
- Conduits upto 38 mm dia. Min. depth = 65 mm
- Conduits upto 50 mm dia. Min. depth = 90 mm dia.

Conduits more than 50 mm Min. depth = 2 x dia.

#### **Galvanized Iron (G.I.) Pipes and Accessories**

The G.I. pipes shall be made of mild steel, galvanized inside and outside by hot-dip galvanizing process. The pipes shall be free from stains, burrs or any other defect. The accessories for G.I. Pipes such as sockets, bends, etc. shall be also galvanized inside and outside and of same quality and specifications as the pipes.

These pipes shall be installed for crossing of cables above nullahs and culverts and at entry into building. The pipes and accessories shall be provided with one thick coat of bituminous paint on the outer surface prior to installation. All pipes shall be secured in position by means of galvanized clamps, supports, etc.

G.I pipes and accessories shall be from the approved manufacturers.

#### **PVC Pipes and Accessories**

The PVC pipe shall be rigid. All pipes shall be minimum Class 'D' (Working pressure - 12 bar), unless otherwise stated on Drawings or Bill of Quantities. The buried PVC pipe should be able to withstand the external load acting upon it by continuous movement of heavy duty vehicles such as trucks, cranes, fork-lift, etc. Where pipe changes direction, manufactured smooth bends shall be used. Bending of pipes by heating or otherwise

will be allowed in special cases only. Bending by heating shall be carried out by first filling the pipe with sand inside and then immediately removing the sand. The use of sharp 90 degree bends and tees will not be allowed. The bends shall conform to same specifications as given for PVC conduits. For jointing of pipe all precautions and procedures recommended by manufacturer shall be followed.

The pipes and accessories shall be from the approved manufacturers.

## **5. INSTALLATION**

### **Concealed Conduits**

Where concealed conduit system is stated on drawings, the conduit shall be installed concealed in roof, wall, column, etc. Conduits shall be laid underfloor only where specifically stated. The entire conduit system shall be installed and checked before wiring is carried out. Any obstruction found shall be cleared before the installation of cable.

When concealed, the conduit shall have a minimum of 32 mm cover of concrete measured from the top of conduit to finished surface. In the reinforced cement concrete (RCC) work the conduit shall be laid before pouring of concrete. Under no circumstances shall chases be made in the RCC structure for concealing conduit and accessories after pouring of concrete. The conduit shall be supported on top of bottom reinforcement of slab. All outlet boxes to be firmly supported and installed such that they finish flush with the soffit of slab or beam.

Where conduits have to be concealed in cement concrete (CC) work after concreting or in block masonry, chase shall be made with appropriate tools and shall not be made deeper than required. The conduit shall then be fixed firmly in the recess and covered with cement concrete mixture. The work of cutting in the cement concrete work or block masonry work shall be co-ordinated with the civil work. The Contractor shall obtain approval from the Engineer before starting chasing and cutting.

The termination of conduits at or near the equipment/ switchboard is shown diagrammatically on the drawings. The exact locations of the termination shall be co-ordinated with the equipment / switchboard to be installed. Any extension of conduit to suit the site condition shall be made without any extra cost. Conduit ends pointing upwards or downwards shall be properly plugged in order to prevent the entry of foreign materials. All openings through which concrete may leak shall be carefully plugged and boxes shall be suitably protected against filling with concrete. At all terminations of conduit, sharp edges of conduit ends shall be prevented to avoid the cutting or damaging of wires or cables during pulling through the conduits.

Underfloor conduit shall be installed at a minimum depth of 2 inch from the finished floor level or as shown on the drawings. The conduits shall be installed empty, before finishing of floor or in RCC work, with an 18 SWG steel wire drawn through the conduit for pulling cable. No conduits shall be laid under floor in bathroom.

Wherever the conduit lengths cross the expansion joint either along the columns or slab, suitable arrangement shall be provided so that when the conduit lengths in the expansion joint are stressed, the conduit shall not crack or break.

### **Surface Conduits**

The surface conduits shall be installed where shown on drawings only. The conduits shall be installed parallel or perpendicular to the surface of wall, structural members, ceiling, etc., by means of steel saddles and clamps of approved design. The conduits shall be kept at least 150 mm away from parallel runs of flues, steam pipes and hot water pipes.

The saddles shall be installed on surface by means of nylon or wooden plugs and galvanized screws. Appropriate size of holes in structure shall be made by drilling, the thickness of saddles shall not be less than 6mm and clamps shall be of 16 SWG sheet steel. The surface conduits shall be supported at a maximum of one metre spacing along horizontal and vertical runs. All accessories for complete installation of conduit system shall be provided by the Contractor. The pull boxes, etc. as stated for concealed conduits shall also be applicable for surface conduit system. The entire steel conduit system alongwith the accessories shall be painted with one coat of black enamel paint after installation.

### **Steel Conduits and Accessories**

The steel conduits and accessories are required to be installed on surface or concealed as shown on the drawings. Wherever possible the conduit(s) shall run on ceiling/beams on the appropriate routes as approved by the Engineer. The conduit(s) down to switches, socket outlets and other instruments shall be concealed in walls. The installation instructions for surface and concealed conduits given in this section are also applicable to the installation of steel conduits and accessories.

### **Galvanized Iron Pipes**

The galvanized iron (G.I.) pipes shall be installed at a minimum depth of 900 mm measured from the top of pipes to finished ground level. The pipe shall be laid and checked for soundness before completion of civil works. The G.I. pipes at the entrance of the buildings shall be installed at locations as shown on the drawings.

At all joints the pipes shall be firmly screwed and cotton yarn with water-proof compound shall be used to make the joint water-proof.

At each termination, the pipe end shall have threads and socket screwed on thread for installing soft metal bush. The soft metal bush shall be of approved quality and shall be male type.

The installation of pipes shall be complete in all respects including its fixing at terminations before the work is started. All sharp edges and burrs shall be removed by using reamer or any approved device. The pipe shall be checked before installation of cable for any obstruction. If found, it shall be cleared without damaging the installation. All pipe ends shall be plugged to prevent entry of water, rodents etc.

### **PVC Pipe & Accessories**

Rigid PVC pipes shall be installed under roads paved areas, at crossing with other services and at cable entering building as shown on the drawings. The depth of the pipe shall vary according to the conditions at site, arid approval of Engineer shall be obtained prior to installation. In general the pipes shall be installed underground at the following depths measured from the top of the pipe.

Under roads/pavement

900mm below finished surface.

When crossing over 250/500 mm vertical/horizontal services clearance with concrete cover

The trench of required dimensions shall be excavated and the bottom of trench cleaned and levelled. A 75mm bed of fine sand shall be provided over which the PVC pipes installed after proper alignment. Where two or more pipes are installed in the same trench the clearance between pipes shall not less than 50mm. After laying of pipe the trench shall be backfilled with clean screened earth in layers of 75mm, each layer properly tamped and compacted.

Where underground cables enter connection terminal boxes the PVC pipe shall be installed on surface by means of galvanized steel clamps at a maximum interval of 450 mm.

After installation, the ends of the pipe shall be plugged with material impervious to water and chemicals. All joints shall be sealed adequately to prevent entry of foreign elements.

The installation of pipes shall be completed in all respects including its fixing at terminations, before cabling work is started. All sharp edges and burrs shall be removed by using reamer or any approved device. The pipe shall be through cleaned of dirt and dust from inside, the pipes shall be installed in proper coordination with other works.

## **SECTION – 406**

### **EARTHING**

#### **1. SCOPE OF WORK**

The work under this section consists of supplying, 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 Section - 401 and with other relevant provisions of the Tender Documents.

#### **2. GENERAL**

The earthing system consists of earth electrodes, earthing leads, earth connecting points, earth continuity conductors and all accessories necessary for the satisfactory operation of the associated electrical system.

### 3. APPLICABLE STANDARDS/CODES

The latest editions of following standards / codes shall be applicable for the materials specified within the scope of this section:

BS 951	Earthing clamps
CP 1013	.Earthing
BS 2874	Nuts, bolts, washers, screws and rivets fixing for use on copper
BS 1433	Hard drawn bare copper conductor for earth
BS 6346	PVC insulated cables.

### 4. MATERIAL

#### 4.1. Earth Electrode

##### a. Plate Type

The plate type earth electrode shall comprise a 600 x 600 x 3mm electrolytic copper plate. The surface of the plate shall be tinned for protection. The plate shall have four terminals for connecting the earthing leads. Nuts bolts and washers shall be either of brass or tinned copper. A 50mm dia. G.I. pipe shall be provided from inspection chamber to earth plate for watering purpose. This pipe shall have 10mm dia. holes at 500mm centre to centre all along the length.

At the ground level an inspection chamber with cast iron cover shall be constructed having dimensions as shown on the drawings. The inspection chamber shall have a cover supported on angle iron frame. The cover shall be hinged type, as approved by the Engineer and shall finish flush with the ground level.

##### b. Rod Type

This type of earth electrode shall comprise a 10 ft. (3 metres) long, 5/8" (16 mm) dia. Copper rod having flat head at drive end and pointed conical tip at the driven end. The tip shall be hardened to facilitate driving. At the top of the pipe, a brass clamp for bolted connections shall be provided suitable for connection to the down conductor or earthing lead as required.

The inspection chamber with C.I. cover shall be provided as specified for plate type earth electrode.

#### 4.2. Earthing Lead

The earthing lead shall connect the earth electrode to earth connecting point or equipment in the building. It shall be of round hard drawn bare electrolytic copper of size shown on the drawings. The cost of earthing leads deemed to have been included in the price of earth electrode and no separate payment shall be made for it.

#### 4.3. Earth Continuity Conductor

Earth continuity conductor (ECC) shall be hard drawn bare copper wire or single core PVC insulated copper conductor cable of sizes indicated on the drawings. All thimbles, lugs, sockets, nuts, washers & other accessories necessary for the complete installation of ECC shall be provided by the Contractor without any extra cost.

The specifications for single core PVC insulated cables used as ECC shall be same as those given in section "LT Cables" of the technical specifications. PVC insulated cables when used as ECC shall be green or green/yellow.

#### **4.4. Earth Connecting Point**

Earth connecting points shall comprise tinned copper bar, rectangular in shape, having dimensions of 300 x 50 x 6 mm. At least six terminals for connection shall be arranged on the bar, which can be increased or decreased as required by the Engineer.

The terminals shall have brass or tinned copper bolts, nuts and washers for protection against corrosion. Two holes shall be provided off centre of the copper bar for fixing to the wall by means of 10 mm dia. nut and bolt and shall be insulated by means of rubber gaskets/washers.

### **5. INSTALLATION**

#### **General**

Complete earthing systems, as shown on the drawing shall be installed by the Contractor. The earthing system shall give earth resistance, including the resistance of soil, earth leads and ECC equal to or less than one ohm.

At all connections of earth continuity conductor to LT switchboard, LT distribution Board or any other metallic body, proper size copper or brass sockets, thimbles or lugs shall be used to which the copper wire shall be connected by copper brazing. The soldering of copper wire at joints or terminations shall not be allowed. All tee-off connections shall be by copper brazing using suitable socket and clamps. After brazing, the jointed surface shall be protected by oxide inhibiting compound of low electrical resistance. For connections to metallic body, the surface shall be thoroughly cleaned before bolting the lug or socket. The earth continuity conductor shall in general run in cable trench or in conduits/pipes as shown on the drawings. For under floor runs, these shall be installed in pipe/conduit of appropriate sizes. Where laid along underground cables, these shall be laid directly underground in unpaved areas and in pipes under paved areas.

#### **Earth Electrode**

##### **a. Plate Type**

The electrode plate shall be installed at a depth of 5 metres from finished ground level or 1 metre below permanent water level whichever is less. The minimum horizontal distance between earth electrodes shall be 3 metres. Proper mixture of lime and charcoal shall be made and buried alongwith the copper plates in the ground to increase the soil conductivity. The electrode shall be installed as per details shown on the drawings. The inspection chambers shall be constructed at locations approved by the Engineer.

##### **b. Rod Type**

In case the soil conditions at site permit, this type of earth electrode may be installed by hammering the electrode in soil, until the top of the rod is about 300 mm below the proposed finished ground level. If hammering down of rod is not possible due to site conditions, a pit shall be first excavated in bare ground upto the required depth and electrode shall be installed upright in the pit. The excavated pit shall be backfilled in layers of 500 mm, each layer tamped and compacted.

### **Earth Continuity Conductor**

The earth continuity conductor of sizes shown on the drawing shall be installed all along the cable runs and connected to the earthing bar/terminals provided in equipment. The body of all switchboards shall also be connected to earth by specified size of ECC. All other metal work shall also be connected to earth by specified size of ECC

At any joint or terminations, the ECC shall be connected using proper accessories. No connection shall be made by twisting of each conductor.

### **Earth Connecting Point**

The earth connecting point shall be installed at locations shown on the drawings. It shall be fixed on wall surface by means of brass screws with nuts, washers and other insulating material as instructed by the Engineer.

## **SECTION – 407**

### **MISCELLANEOUS ITEMS**

#### **1. SCOPE OF WORK**

The work under this section consists of supplying, installing, testing and commissioning of all material and accessories for Miscellaneous Items as specified herein and/or shown on the drawings and given in the Bill of Quantities.

The Contractor shall discuss the electrical layout with the Engineer and co-ordinate at site with other services for exact locations and positions of the Miscellaneous Items.

The Miscellaneous Items with accessories shall also comply with the General Specifications for Electrical Works Section - 401 and with other relevant provisions of the Tender Document.

#### **2. GENERAL**

The Miscellaneous Items as described in this section shall comply with other sections of these specifications as applicable. No specific reference to any manufacturer has been made and the Contractor shall ensure that

all the miscellaneous items be supplied/fabricated from the reputable manufacturers, who have already supplied/fabricated similar items.

### 3. **APPLICABLE STANDARDS/CODES**

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

BS 4752-1	Circuit Breakers.
BS 4934	Safety requirements for electric fans and regulators
BS 5060	Performance of circulating fans and their regulators.

### 4. **MATERIAL**

#### **Metal Enclosed Switch Fuse Unit & MOB Units**

The single pole & neutral 250 volts and triple pole 500 volts switch fuse or MCB units are used for supplying single phase/three phase power control for the apartments/houses installed near supply company meter-boards or required for equipment as specified and as shown on the drawings.

The handle of the switch shall be so interlocked that it would not be possible to open the cover without putting the handle in the "OFF" position.

The switch fuse unit shall be of FICO make or approved equivalent.

#### **Ceiling Fan**

Ceiling fan shall be capacitor type, suitable for 250V AC. The air displacement shall be 12,000 cfm for 56' (1422 mm) sweep and 10,000 cfm for 48" (1219 mm) sweep at maximum speed. The fan motor shall be capacitor type and bearing shall be groove type to give noiseless operation. The complete fan with blades and canopy shall be finished in white colour.

The fan hook shall be made of 16 mm diameter mild steel rod. It should be in the form of a loop about 75 mm long and about 50 mm wide. The rod should be bent to have at least 200 mm extension on both sides for tying to reinforcement steel of slab.

Normally fans are not part of this contract. However, for regulating the speed of the fan, fan dimmers shall be provided having electric circuit. Dimmer shall be so designed that it shall not interfere with electronic equipment or fluorescent light fixtures.

#### **Exhaust Fans**

Exhaust Fans shall be three blade type of metal construction, mounted on steel mounting plate with Orifice ring.

Fans shall be direct driven and supplied complete with electric motor, back draft dampers and antivermin screen.

The bearings shall be ball, roller or sleeve, type of permanently lubricated and sealed type.

Wheels shall be heavily and rigidly constructed and accurately balanced both statically and dynamically and be free from objectionable vibration or noises.

### **Manholes with CI Cover & Frame**

Manholes for electric power cables or telephone cables shall be constructed in accordance with the standard Specifications of Civil works. The work shall also include making of concrete chambers and concrete benching in manholes, complete as shown on the drawings. Top of the cover shall be roughened in an approved pattern. The cover shall tightly fit in the frame and shall be watertight. The manhole shall have appropriate identification code as instructed by Engineer.

CI covers complete with frame shall be of the size specified on the drawings. The specified size means the clear opening. The cover shall be of 100 kg weight or as approved by the Engineer. Suitable locking and lifting arrangement shall also be provided. The frame shall be set in place at the time of pouring of concrete so that the cover shall tightly fit in the frame.

## **5. INSTALLATION**

### **General**

The mounting heights, depths and other dimensions of all the Miscellaneous Items are stated on the drawings or in general notes. In case of any discrepancy, the instructions of the Engineer shall be obtained before fixing the item.

### **Metal Enclosed Switch Fuse Unit & MCB Units**

The metal enclosed switch fuse or MCB unit shall be installed on wooden box with screws or some suitable arrangements as approved by Engineer.

### **Ceiling Fan**

Fan hook shall be installed in the RCC ceiling and to the reinforcement before pouring of concrete.

The installation of fan shall include fixing of blades, down-rod, clamp, canopy, including testing and commissioning. The down rod shall be of required length having long threads and shall be, provided with check nuts to secure it firmly with the clamp and with the body of the fan. A split pin shall be provided both at the fan body end and at the clamp for safety. Any scratches on the body of the fan or fan rod appearing during installation shall be cleaned and painted properly with the same quality paint as provided by the manufacturer. Wiring between the ceiling rose and the fan terminals shall be carried out with three core 0.75 sq.mm PVC insulated, PVC sheathed flexible copper conductor cable.

### **Exhaust Fan**

The propeller exhaust fan shall be installed in the opening already made in the wall and shall be firmly fixed by means of flat head galvanized screws.

Wiring between the ceiling rose and the fan terminals shall be three core 1.0 sq.mm PVC insulated PVC sheathed flexible cables.

### **Manholes with CI Cover & Frame**

The manholes shall be constructed according to the Specifications of the civil works and standard practice. Proper curing of the concrete shall be done for at least 15 days. Before constructing, the Contractor shall submit shop drawing of manhole showing steel reinforcement, embedded pipes, clearances, etc. for approval of the Engineer. Quality of cement used in the manhole shall be sulphate resistant.

## **SECTION – 408**

### **TV DISTRIBUTION SYSTEM**

#### **1. SCOPE OF WORK**

The work under this section consists of supplying, installing, testing and commissioning of all material and services of complete Cable Antenna TV System as stated herein, as shown on Tender drawings and as given in the Bill of Quantities.

The Contractor will discuss the electrical layout with the Engineer and coordinate at site with other services for exact route, location and position of electrical lines and equipments.

TV distribution system with accessories shall also comply with the general Specifications for Electrical works Section 401 and with other relevant provisions of the Tender documents.

#### **2. GENERAL**

The TV system shall comprise of the following:

- Conduit with galvanized steel pull wire.
- Pull boxes.
- TV outlet box and blank cover platen.

#### **3. APPLICABLE STANDARDS/CODES**

IEC-728 and relevant DIN standards shall be applicable for the material covered within the scope of this section.

#### **4. MATERIAL**

##### **Outlet Wall Sockets**

The outlet box for the TV socket shall have appropriate dimension made of 16 SWG sheet steel and suitable arrangement for termination of conduits and installation of TV socket.

A 3.2 mm thick white plastic plate with grommet hole shall be fixed on the box having suitable arrangement of TV socket as and when required.

### **PVC Pipe**

Specifications of the PVC pipes are the same as given in the relevant section of these specifications.

## **5. INSTALLATION**

### **Conduit**

The television conduit shall be installed in accordance with the instructions and details given in section "Conduit and Pipes" of these specifications. Television conduit shall be laid 150mm away from the electrical conduits or cables, and wherever electrical conduits or cables, and TV conduits cross each other, they shall do so at right angles.

Identification marking shall be given at the termination or free end of conduit so that it may not be confused with the electrical conduits. The marking shall be both by colour and by attaching an approved brass tag using brass or bronze tie wire. Each tag shall be clearly stamped with "TV" for television conduit.

Full length of conduit shall be provided with galvanized steel pull wire for ease of pulling the telephone cable as and when required.

### **TV Outlet**

These shall be installed flush with the surface of wall.

## **SECTION - 409**

### **APPROVED MANUFACTURERS/BRAND**

<b>Sr. No.</b>	<b>Description</b>	<b>Make</b>	<b>Manufacturer/Supplier</b>
1	11 KV Panel	Pel, Siemens, Areva	PEL Ltd. Lahore, Siemens Lahore, Areva Lahore

2	LTMPB, SMPB, DB's, PFI Plant, Cable tray, Cable ladder, MS Box	Pel, EPCS, QS, SA, RS, CSG	PEL Ltd. Lahore, Electrical power & Control system, Quality Switchgear Lahore, SA electric Lahore, RS electric Panel Lahore, CSG engineering services
3	Transformer	Pel, Siemens, Elmetec, Climax	PEL Lahore
4	ACB, MCCB, RCCB, MICB	Legrand, GE, ABB, Terasaki	Shahid International, Inpro, Shaheen corp Lahore, Jubilee corp Karachi
5	Current Transformer	Fico, Entes, Frer, Siba	Sheikh Walayat & Sons Karachi, Shahid International Lahore, Rachena Corporation Lahore, Inpro Lahore
6	Ammeter (Digital)	Entes, Frer, Lumel, Autonics	Shahid International Lahore, Rachena Corporation Lahore, Inpro Lahore, Jubilee Corp Lahore

7	Voltmeter (Digital)	Entes, Frer, Lumel, Autonics	Shahid International Lahore, Rachena Corporation Lahore, Inpro Lahore, Jubilee Corp Lahore
8	Selector Switches (Ammeter & Voltmeter)	Kelmin&Breter, Kraus & Niamer	Sheikh Walayat& Sons Karachi, Jubilee Corp Lahore, Emzedeng Lahore
9	Indication Lamps	Legrand, Maruyasu, GE	Shahid International Lahore, Inpro Lahore, Jubilee Corp Lahore
10	Wiring terminal	Legrand, Cabour, GE	Shahid International Lahore, Rachena Corporation Lahore, Inpro Lahore
11	Low tension cable, Single core & multi core	Pakistan Cables, Newage, Universal Cables, Fast Cables, HM Cables, GM	Pakistan Cables, Newage, Universal Cables, Fast Cables, HM Cables, GM
12	Wiring Accessories, Switches, Sockets, Data & Voice Sockets	legrand, Clipsal, MK	Shahid International, Electrolite Lahore
13	PVC Conduit and accessories	Beta, Popular, Polo, GM	Shafi sons Lahore, Popular Lahore, Polo Pipes, GM pipe Lahore
14	Ceiling fans, bracket fans, exhaust fans	Yunus, Pak Fans, Millat, Asia, Climax, Royal	Yunus, Pak Fans, Millat, Asia, Climax, Royal
15	Lighting fixtures	Philips, Sunlight, Pierlite, Paklite	Philips, Sunlight, Pierlite, Paklite

**SECTION - 501**

EXCAVATION OF UNSUITABLE OR SURPLUS MATERIAL

**1. SCOPE FO WORK**

Unsuitable or Surplus Material is the material arising from roadway excavation which is declared in writing by the Engineer to be unsuitable for use or surplus to the requirements of the Project.

**2. CONSTRUCTION REQUIREMENTS**

All suitable material excavated within the limits and scope of the project shall unless provision is expressly made to the contrary in these specifications be used in the most effective manner for the formation of the embankment, for widening the roadway, for backfil, or for other work included in the Contract.

Any material surplus to this requirement or any materials declared in writing by the Engineer to be unsuitable shall be disposed of and leveled in suitable layers by the Contractor outside the right of way or as directed by the Engineer.

When unsuitable material is ordered to be removed and replaced the soil left in place shall be compacted to a depth of 8" to a density of 95 percent of the maximum dry density determined according to AASHTO T 99 Method D. Payment for such compaction shall be included in the contract prices for the excavation of unsuitable materials.

If the unsuitable material which is removed is below standing water level and the replacement material is gravel or a similar self-draining material of at least 300mm depth, the compaction may be dispensed with if approved by the Engineer.

**3. MEASUREMENT**

Only material which is surplus to the requirements of the project or is declared in writing by the Engineer to be unsuitable will qualify for payments under this Section.

The cost of excavation of material which shall be deemed to be included in the pay items relating to the parts of the work where the material is used.

Item shall include the cost of obtaining the consent of the Owner or tenant of the land where the disposal of surplus or unsuitable material is made.

Unsuitable or Surplus Material shall be measured in its original position and its volume shall be calculated in cubic feet.

**4. PAYMENT**

The quantities determined as provided above shall be paid for at the contract unit price respectively for each of the particular pay items listed below and shown in the Bill of Quantities which prices and payment shall constitute full compensation for all the costs involved in the proper completion of the work prescribed in this item.

**SECTION - 502**  
**COMPACTION OF NATURAL GROUND**  
**/TOP OF STRIPPED AREA**

**1. SCOPE OF WORK**

The work shall consist of compacting the cleared / stripped surfaces, before the embankment is commenced in accordance with these specifications.

**2. CONSTRUCTION REQUIREMENTS**

The cleared surface of the original ground shall be compacted to a depth of 8" to 95 percent of the maximum dry density, as per requirements of Section-203 "Formation of Embankment" if it falls within 1 meter from the maximum finished top level otherwise to 85% of the maximum dry density determined according to AASHTO T 99 Method D.

**3. MEASUREMENT**

The quantity to be paid for shall be the number of square feet directed to be compacted and accepted by the Engineer for payment.

**4. PAYMENT**

The area determined as provided above shall be paid for at the contract unit price for the pay item listed below and shown in the Bill of Quantities which price and payment shall constitute full compensation for all the costs necessary for the proper completion of the work prescribed in this item.

## SECTION - 505

### INTERLOCKING CONCRETE PAVEMENTS

#### 1. SCOPE OF WORK

The work shall consist of precast concrete paving blocks intended for the construction of low speed roads, parking areas, lay byes, industrial and other paved surfaces subjected to all categories of static and vehicular loading and pedestrian traffic. Paving blocks covered by these specifications are designed to form a structural element and the surfacing of pavements, having the block to block joints filled, so as to develop frictional interlock and placed in conformity with the lines, grades, thicknesses and typical cross-section shown on the drawings or as directed by the Engineer.

#### 2. MATERIAL REQUIREMENTS

For execution of this item provisions made in BS 6717 shall be applicable. Detailed requirement of materials and construction shall be as under:

##### 2.1 Binders and Binder Constituents

Paving blocks shall be made using one or more of the following binders or binder constituents complying with the requirements of the relevant standards:

Ordinary Portland Cement	BS 12
Portland Blast Furnace Cement	BS 146: Part 2
Portland Pulverized Fuel Ash Cement	BS 6588
Pulverized fuel ash	BS 3892: Part 1
Ground granulated Blast furnace slag	BS 6699

Where pulverized fuel ash is used, the proportions and properties of the combination with Portland Cement shall comply with BS 6588.

Where ground granulated blast furnace slag is used, the proportions and properties of the combination with Portland cement shall comply with BS 146: Part 2.

##### 2.2 Aggregate

Paving blocks shall be made using one or more of the following aggregates complying with the relevant standards:

Natural Aggregates (Crushed or Uncrushed)	BS 882:1983 (except grading requirements in clause 5)
Air Cooled blast furnace slag	BS 1047 :1083 (except grading requirements in 4.8)
Pulverized fuel ash	BS 3892: Part-1 or Part-2
Ground granulated blast furnace slag	BS 6699

##### 2.3 Acid Soluble Material (Fine Aggregate)

When tested as described in BS 812: Part 119, the fine aggregate (material passing a 5 mm sieve complying with BS 410) shall contain not more than 25% by mass of acid soluble material either in the fraction retained on, or in the fraction passing, a 600 µm sieve.

## **2.4 Water**

The water shall be of drinking quality or in accordance with the recommendations of appendix A of BS 3148: 1980.

## **2.5 Admixtures And Pigments**

Proprietary accelerating, retarding and water reducing agents shall comply with BS 5075: Part 1.

Pigments shall comply with BS 1014.

Calcium chloride shall comply with BS 3587

## **2.6 Finishes**

The finish should be agreed between the manufacturer and the Engineer. Concrete described as “natural colour” shall contain no pigment.

In composite paving blocks the surface layer shall be formed as an integral part of the block and shall be not less than 5 mm thick.

## **2.7 Binder Content**

The cement content of the compacted concrete shall be not less than 380 kg/m<sup>3</sup>. For equivalent durability, paving blocks made with binder constituents other than ordinary Portland cement shall have higher binder content than paving blocks made in a similar way using only Portland cement. The Engineer will decide the additional binder content. The compressive strength test will be the only guide to the amount of additional binder needed.

## **2.8 Sizes And Tolerances**

### **2.8.1 Sizes**

Paving blocks shall have a work size thickness of not less than 60 mm. Type-R blocks shall be rectangular with a work size length of 200 mm and a work size width of 100 mm. Type-S blocks shall be of any shape fitting within a 295 mm square coordinating space and shall have a work size width not less than 80 mm.

The preferred work size thicknesses are 60 mm, 65 mm, 80 mm & 100 mm.

A chamfer around the wearing surface with a work size not exceeding 7 mm in width or depth shall be permitted.

All arises shall be of uniform shape.

### **2.8.2 Tolerances**

The maximum dimensional deviations from the stated work sizes for paving blocks shall be as follows:

Length	$\pm 2\text{mm}$
Width	$\pm 2\text{mm}$
Thickness	$\pm 3\text{mm}$

Where a paving block includes profiled sides, the profile shall not deviate from the manufacturer's specification by more than 2 mm.

### **2.8.3 Compressive Strength**

The compressive strength of paving blocks shall be not less than  $49 \text{ N/mm}^2$  and the crushing strength of any individual block shall be not less than  $40 \text{ N/mm}^2$ .

### **2.8.4 Sampling**

The following sampling procedure shall be used for the compressive strength test.

- a. Before laying paving blocks, divide each designated section, comprising not more than 5000 blocks, in a consignment into eight approximately equal groups, clearly mark all samples at the time of sampling in such a way that the designated section or part thereof and the consignment represented by the sample are clearly defined. Take two (2) blocks from each group.
- b. Dispatch the sample to the test laboratory, taking precautions to avoid damage to the paving blocks in transit. Each sample shall be accompanied by a certificate from the person responsible for taking the sample, stating that sampling was carried out in accordance with this Part of BS 6717.
- c. Protect the paving blocks from damage and contamination until they have been tested. Carry out any tests as soon as possible after the sample has been taken.

### **2.8.5 Marking**

The following particulars relating to paving blocks made in accordance with this standard shall be indicated clearly on the delivery note invoice, manufacturer's or supplier's certificate or brochure supplied with the consignment of blocks:

- a. The name, trade mark or other means of identification of the manufacturer.
- b. The number and date of this British Standard, i.e. BS 6717 : Part 1: 1986\*, or latest revision.

## **3. CONSTRUCTION REQUIREMENTS**

### **3.1 Laying the Concrete Blocks**

The total area to be covered with paving block shall be prepared by:

- a. Compaction of subgrade
- b. Laying of subbase in a thickness specified
- c. Laying of crushed aggregate base or lean concrete in thickness as per typical section

### **3.2 Tolerance**

Tolerance of these layers shall be as per applicable requirement of each item of these specifications.

Payment for each of the above item shall be made under the relative item of work.

The total area will thereby be divide with nylon strings into sectors of not more than 1.5 square meters. This shall be done to control the alignment of paving blocks and to avoid multiplication of deviation in sizes of paving blocks.

### **4. MEASUREMENT**

The area to be measured shall be bound by lines shown on the drawings or as directed by the Engineer. Unit of measurement shall be square foot measured in horizontal plane.

### **5. PAYMENT**

The quality determined as provided above shall be paid for the unit price of contract for each square meter of paving block installed (excluding sand cushion and sand filling in joints which will be paid separately) and all other work related for installing paving blocks. Cost shall include all labour, materials and equipment for proper completion of work.

## LOT - A

**Tender No.: RED-LHR-LIFT-SLB-MULTAN-09-2026**

<b>SUPPLYING, INSTALLATION, TESTING, COMMISSIONING OF LIFT AND ALLIED WORKS AT SLB, MULTAN</b>					
<b>LIFT</b>					
<b>SR#</b>	<b>DESCRIPTION</b>	<b>UNIT</b>	<b>QTY</b>	<b>RATE (RS.)</b>	<b>AMOUNT (RS.)</b>
1	Providing, installing, testing, commissioning of passenger lift (cabin size 1600mm x 1550 mm, capacity 15 persons/1125kg, 60MPM, 6/6 Stops/Opening (G+5)) Equipment Compliance to EN81-1-2000 complete with all mechanical, electrical, and safety(EN 81) , including Lift ROOM (with stainless steel and double glazed tempered glass) all accessories and works required for proper functioning, as approved by Engineer-in-Charge Traction machine : Taiwan/Japan/Europe Based Brands (Otis , Kone, Schindler, Thyssenkrupp, Orona or equivalent) Rope brand: Brugg or equivalent Guide Rail Brand: Saveria or equivalent Inverter brand: as per manufacture / supplier Product manufacturing Europe, USA, Malaysia	EACH	1.00		
2	Dismantling cement concrete reinforced, separating reinforcement from concrete, cleaning and straightening the same including clearing the site and desposing off the debris	CFT	189.00		
3	Providing, fabricating, and erecting steel works for lift. The work includes cutting, welding, grinding, straightening, lifting, positioning, and securing the steel column, beam in suitable alignment; complete provision of base plates, gusset plates, anchoring bolts, and required stiffeners; application of anti-rust primer and two coats of synthetic enamel/weather-resistant paint; and all labour, tools, machinery, scaffolding, consumables, and incidental materials required to complete the work in all respects as directed by the Engineer-in-Charge	Kg	16755.82		
4	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-(b) Reinforced cement concrete in retaining/ Shear walls laid in situ or precast laid in position, or prestressed members cast in situ (Formwork on both sides) , complete in all respects: (2) Type B (nominal mix 1:1-1/2:3) (i) Upto 9" thick (Avg)	CFT	306.15		

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
5	Providing and laying reinforced cement concrete (including prestressed concrete), using Ordinary Portland Cement / Sulphate resisting cement / Slag cement as may be required; coarse sand and screened graded and washed aggregate, in required shape and design, including forms, moulds, shuttering, lifting, compacting, curing, rendering and finishing exposed surface, complete (but excluding the cost of steel reinforcement, its fabrication and placing in position, etc.):-(c) Reinforced cement concrete in Pile cap, slab of rafts / strip foundation, base slab of column and retaining walls; etc and footing beams, other structural members other than those mentioned in 6(a-d) above not requiring form work (i.e. horizontal shuttering) complete in all respects: (3) Type C (nominal mix 1: 2: 4)	CFT	312.90		
6	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 4: 8	CFT	370.02		
7	Fabrication of mild steel reinforcement for cement concrete, including cutting, bending, laying in position, making joints and fastenings cutting, bending, laying in position, making joints and fastenings reinforcement (also includes removal of rust from bars):- reinforcement (also includes removal of rust from bars):- (ii) (Grade-60)	Kg	3714.30		
8	Cement plaster 1:4 :b) ½" (13 mm) thick				
	ii)Ground Floor	SFT	299.98		
	iii)1st Floor To 5Th Floor	SFT	399.90		
9	Supply and installation of 12mm tempered glass at external faces of lift frame, including SS clamps, SS spider sealant and other accessories complete in all respects as directed by Engineer-in-Charge.	SFT	2580.00		
10	Dismantling / demolition of brick masonry including removal, stacking of serviceable bricks, disposal of debris, and all labour, tools, and equipment complete as directed by Engineer-in-Charge	CFT	288.00		
<b>Total LIFT Work</b>					
<b>Note: The rates are inclusive of all applicable taxes (PST, GST and Income Tax etc)</b>					
<b>Each LOT will be separately evaluated(both technical &amp; financially) and separately awarded.</b>					

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
<b>LOT- B</b>					
<b>Tender No.: RED-LHR-CIVIL-SLB-MULTAN-09-2026</b>					
<b>REHABILITATION OF COMMON &amp; WASHROOM AREAS AND ALLIED WORKS AT SLB, MULTAN</b>					
<b>A- WASHROOM AREA - CIVIL WORKS</b>					
SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
1	Dismantling / demolition of brick masonry including removal, stacking of serviceable bricks, disposal of debris, and all labour, tools, and equipment complete as directed by Engineer-in-Charge	CFT	1755.00		
2	Dismantling / removal of existing floor or wall tiles including stacking of serviceable tiles, disposal of broken tiles and debris, and all labour, tools, and equipment complete as directed by Engineer-in-Charge	SFT	4597.50		
3	Pacca brick work in ground floor:- i) cement, sand mortar:- Ratio 1:5				
	i)Ground Floor	CFT	260.64		
	ii)1st Floor To 5Th Floor	CFT	1303.20		
4	Dismantling cement concrete 1:2:4 plain disposal of debris, and all labour, tools, and equipment complete as directed by Engineer-in-Charge	CFT	192.00		
5	Cement plaster 1:4 :b) ½" (13 mm) thick				
	ii)Ground Floor	SFT	1900.00		
	iii)1st Floor To 5Th Floor	SFT	9500.00		
6	Providing and laying superb quality Ceramic tiles dado of Master/ Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture skirting/dado of approved Color and Shade with adhesive bond over 1/2"thick (1:2) cement plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects as approved and directed by the Engineer Incharge i) 12"x18"/12"x24"/10"x24" /8"x24"/12"x36"	SFT	5700.00		
7	Providing and fixing 2" wide MS/ GI Chowkat singel/double rebate made of 16 SWG MS sheet pressed/welded / supported with M.S. flat 1- 1/4"x1/8" i/c 6"long M.S. Flat 1"x1/8"hold fasts (6-Nos) welded/ screwed, punching of lock holecovered with MS Box,coating with antirust paint including filling with cement sand mortar (1:8) and embedding hold fast in cement concrete (1:2:4) ,complete in all respect as approved and directed by Engineer Incharge (iii) 5.5 " wide	SFT	840.00		
8	P/F 1-1/2" thick solid flush door comprising of 2.5 mm thick Deodar/Ash/Oak ply with grooves , compressed over 2.5 mm thick commercial ply over 1" thick packing wood in style and rails under proper pressurei/c thecost of nails, tower bolt , handles, glue, sawing chargesand lacquar polishing to show the grains of ply properly, sand papering and 3/8" thick matching wooden lipping as approved and directed by the Engineer Incharge.	SFT	294.00		
9	Providing and fixing PVC door complete with hardware, fittings, cutting, fixing, and finishing as directed by Engineer-in-Charge	SFT	525.00		
10	Preparing surface and painting with emulsion paint:- 3 coat	SFT	5700.00		
11	Cement plaster 3/8" (10 mm) thick under soffit of R.C.C roof slabs only, upto 20' height b) 1:3	SFT	2257.50		

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
12	Providing and laying superb quality Ceramic tile floors of Master/ Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Textureof approved Color and Shadeas per approved design with adhesive bond, over 3/4" thick (1;2) cement sand plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects and as approved and directed by the Engineer Incharge i) 12"x18"/12"x24"/10"x24" /8"x24"/12"x36"	SFT	2257.50		
13	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (i) Ratio 1: 4: 8	CFT	745.02		
14	Cement concrete plain including placing, compacting, finishing and curing complete (including screening and washing of stone aggregate): (f) Ratio 1: 2: 4.	CFT	383.82		
15	Providing and fitting all types of glazed aluminium windows of anodised bronze colour partly fixed and partly sliding using delux sections of approved manufacturer having frame size of 100 x 20 mm (4"x¾") and leaf frame sections of 50 x 20 mm (2"x¾"), all of 1.6mm thickness including 5 mm thick imported tinted glass with rubber gasket using approved standard latches, hardware etc., as approved by the Engineer in-charge	SFT	162.00		
16	Providing and fixing Aluminum Fly screen comprising of Fiber / Aluminum wire guaze (Malasian) fixed in aluminum frame of approved manufacturer brownze Colour / powder coated of size 1-1/2"x1/2" and 1.6mm thick with rubber gasket i/c cost of Hardwares as approved and directed by the engineer incharge. complete in all respect.	SFT	81.00		
<b>A- WASHROOM AREA - CIVIL WORKS (SUB-TOTAL)</b>					
<b>B- WASHROOM AREA - PUBLIC HEALTH WORKS</b>					
SR	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
1	Providing and fixing chromium plated tee stop cock 15mm (½")	Each	120		
2	Providing and fixing BATHROOM ACCESSORIES (7-piece set) - One Cosmetic Shelf, One Towel rod with bracket, One soap dish, One double hook, One towel ring, brush holder, toilet paper holder & looking glass i/c the cost of hardwares etc complete in all respect as approved and directed by the Engineer incharge:-i) chromium plated soap dish	Each	48		
3	do :ii)chromium plated toilet paper holder	Each	48		
4	do :iii)chromium plated towel rail	Each	30		
5	do:iv) chromium plated shelf 60x13 cm (24"x5") with bracket and railing	Each	36		
6	do: vi)Looking glass withchromium plated frame, including fitting against wall and locking arrangement complete in all respect as directed by engineer incharge	SFT	36		

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
7	Providing, fixing, testing and commissioning of $\mu$ -PVC (Unplasticized polyvinyl Chloride ) Nikasi/ waste pipe Fittings make of dadex /Popular/Beta/BBJ conforming to code EN-1401 including the cost of Solvents complete in all respect as approved and directed by the Engineer Incharge. (a) P-Trap (i) 4" dia	Each	54		
8	ditto(a) P-Trap (ii) 3" dia	Each	108		
	Providing, laying, testing and commissioning of POLYPROPYLENE RANDOM COPOLYMER (PPRC) water supply pipe made of (Dadex /Popular/ Beta / BBJ) with specified pressure rating PN (PRESSURE NOMINAL)and conforming to DIN 8077-8078 code i/c cost of solvent, specials,making jharries complete in all respect as approved and directed by Engineer Incharge.(Internal/External Diameters mentioned).PN-25 pipe				
9	(i) 20 mm	Rft	840		
10	(ii) 25 mm	Rft	600		
11	(iii) 32 mm	Rft	600		
12	(iii) 40 mm	Rft	600		
13	(vi) 63 mm	Rft	180		
	Providing, fixing, testing and commissioning of $\mu$ -PVC (Unplasticized Polyvinyl Chloride ) Nikasi/ SWV pipe, Dadex / Popular / Beta or approved equivalent manufacturer, plain / Bell Ended / Z - oints conforming to BS 4514 / BS 5255 - EN 1329 including the cost of specials and Solvents complete in all respects, as per drawings & pecifications and / or as approved and directed by the Engineer Incharge.				
14	(iv) 82mm	Rft	1404		
15	(v) 110 mm	Rft	702		
16	(vi) 160 mm	Rft	540		
18	Providing and fitting one pieceEuropean Coupled set of Water Closet (WC) and flushing Cistern of PORTA brand (full size) or approved equivalent manufacturer i/c the cost of CP/rubber connection, thimble, normal seat cover and rawal bolts complete in all respects as approved and directed by the Engineer Incharge.	Each	18		
19	Providing and fitting glazed earthen ware water closet, squatter type (Orisa pattern), combined with foot rest i) white	Each	30		
20	Providing and fitting plastic made low down flushing cistern 13.63 litre (3 gallons) capacity, including bracket set, copper connection, etc. complete.	Each	18		
21	Providing and fixing CP bath Room Set made of Sonex/Master/Faisal comprising of 3-No Tee stop cocks, lever type Basin Mixer, double Bib Cock, open wall shower, Muslim shower,waste coupling and bottle trap etc. complete in all respect as approved and directed by the Engineer incharge (v) Muslim shower	Each	48		

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
22	Providing and fixing CP bath Room Set made of Sonex/Master/Faisal comprising of 3-No Tee stop cocks, lever type Basin Mixer, double Bib Cock, open wall shower, Muslim shower,waste coupling and bottle trap etc. complete in all respect as approved and directed by the Engineer incharge(iii) Double Bib Cock	Each	60		
23	ditto: (ii) Lever Type Basin Mixer	Each	30		
24	Providing and fitting 10 cm (4") gully trap, including cement concrete, cost of PVC grating 15x15 cm (6"x6") and masonry chamber 30x30 cm (12"x12").	Each	18		
25	Providing and fitting glazed earthen ware wash hand basin /vanity 56x40 cm (22"x16") including bracket set, waste pipe and waste coupling, etc. v) Under Counter Vanity Basin	Each	36		
28	Providing and fitting, chromium plated or brass oxidised, swan neck cock 15 mm (½") dia. ii) two way	Each	12		
29	Providing, laying, cutting, jointing, testing and disinfecting G.I. pipeline in trenches, with socket joints, using G.I. pipes of B.S.S. 1387-1967 complete in all respects, with specials and valves 2) Medium Quality g) 2½ i/d (65 mm) 3.65mm thick	Per Rft	130		
30	Providing and fixing CP heavy duty brass Ball valve with CP handle of specified diameter made of Faisal/Sonex / Master best quality or equivalent complete in all respect as approved and directed by the Engineer Inchargeiii) 1" dia	Each	18		
31	iv) 1-1/4" dia	Each	18		
32	vii) 2-1/2" dia	Each	6		
33	Providing and fixing CP Waste Coupling & Bottle Trap made of Sonex/Master/Faisal or approved equivalent manufacturer, complete in all respect as approved and directed by the Engineer incharge	Each	36		
<b>B- WASHROOM AREA - Public Health WORKS (SUB-TOTAL)</b>					-

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
<b>C- COMMON AREA - CIVIL WORKS</b>					
SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
1	Providing and laying superb quality Porcelain glazed tiles flooring of Master/ Stile brand or approved equivalent manufacturer of specified size in approved design, Color and Shade with adhesive/bond over 3/4" thick (1:3) cement plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respect as approved and directed by the Engineer Incharge a) Full body Glazed tiles (iii) 600mmx 600 mm	SFT	4500.00		
2	Providing and laying superb quality Porcelain glazed tiles of Master/ Stile brand or approved equivalent manufacturer, skirting/dado of specified size, Color and Shade with adhesive/ bond over 1/2" thick (1:2) cement plaster i/c the cost of matching sealer for finishing the joints, cutting grinding complete in all respect as approved and directed by the Engineer Incharge. a) Full body Glazed tiles (iii) 600mmx 600 mm	SFT	600.00		
3	P/L false ceiling comprising of 5/8" thick plaster of paris sheet of required size in approved design with one line of 6" wide niche all around , hanging with Copper wire(16 SWG) duly enriched with POP and flaxen i/c the cost of making space for rope light /screws/jute/making holes for lights and rawal plugs complete in all respects as approved and directed by the Incharge.(Measurement will be made as per carpet Area)	CFT	4500.00		
4	Providing, fabricating, and fixing MS stair structure consisting of side channels as stringers, with 1/8" thick MS chequered plate fixed in the center for treads and risers, including cutting, welding, grinding, drilling, proper alignment, anchoring with existing structure with epoxy, and all necessary fittings. The item also includes providing and fixing MS railing made of 2" dia, 16 SWG pipe with vertical posts of height 2'-9" at each step, complete with all supports. Apply one coat of red oxide primer and two coats of approved finishing paint to the entire steel structure and railing. Complete in all respects as approved by the Engineer-in-Charge	Kg	2006.06		
5	Dismantling / removal of existing floor or wall tiles including stacking of serviceable tiles, disposal of broken tiles and debris, and all labour, tools, and equipment complete as directed by Engineer-in-Charge	SFT	4500.00		
<b>C- WASHROOM AREA - CIVIL WORKS (SUB-TOTAL)</b>					

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
<b>D- COMMON &amp; WASHROOM AREA - ELECTRICAL WORKS</b>					
SR.	DESCRIPTION	UNIT	QTY	UNIT PRICE	TOTAL PRICE
1	P/F wall mounted DB (Distribution Board) made with 16SWG Sheet (Recessed/Surface mounted Type), Powder coated Paint, i/c the cost of Lock, Indication lights, Thimble, Copper Comb, Wiring, Neutral & Earth Bar, Door Earthing, Digital Voltmeter, Digital Ammeter, Volt Selector Switch, Ammeter selector switch, Current Transformers and Controles Complete in all respect as approved and directed by the Engineer Incharge (Breakers will be Paid Separately).				
	LT Switchboards (a) 6" deep (ii) 75~100A	P.CFT.	18		
2	Supplying, Installation and commissioning of MCB (Miniature Circuit Breaker) of specified rating made of LEGRAND FRANCE/ GE U.S.A / SCHNEIDER GERMANY /SIEMENS/TERASAKI JAPAN/ ABB SWITZERLAND or approved equivalent manufacturer in pre-laid DBs and Panels i/c the cost of screws, necessary wire complete in all respect as approved and directed by the Engineer Incharge.				
	OUTGOING BREAKER				
	Single Pole				
	(ii) 6-40 Amp (6 KA)	No.	60		
3	Providing and fixing DB/Panel accessories of required rating and size i/c copper screws of approved brand Complete in all respect as approved and directed by the Engineer Incharge.				
	Selector Switch	No.	6		
	Current Transformer Coil (Make: Metelx/Fico)	No.	6		
	Digital Voltmeter (0-600 Volt)	No.	6		
	Digital Ammeter (0-9999 Amp)	No.	6		
4	Supply and erection of single core PVC insulated, PVC sheathed copper conductor, 600/1000 volts grade cable, in pre-laid G.I. pipe/M.S. conduits/PVC pipe/G.I. wire/trenches, etc (rate for cable only):- (Make Paskistan Cables, Fast Cables & Newage Cables).				
	iii) 10.00 mm sq (7/0.052")	Mtr.	360		
8	Supply and erection of PVC pipe for wiring recessed in walls including inspection boxes, pull boxes, hooks, cutting jharries and repairing surface, etc., complete with all specials (Make Popular, Beta or Equivalent)				
	ii) 20 mm i/d	Mtr.	360		
	iii) 25 mm i/d	Mtr.	300		
10	Supply and erection of single core PVC insulated copper conductor cables, in pre-laid PVC pipe/M.S. conduit/G.I pipe/wooden strip atten/wooden casing an capping/G.I. wire/trenches (rate for cables only):- (Make Paskistan Cables, Fast Cables & Newage Cables)				
	c) 450/750 volts, PVC insulated:				
	ii) 1.5 mm sq (3/0.029")	Mtr.	2400		
	iii) 2.5 mm sq (7/0.029")	Mtr.	600		
	v) 6 mm sq (7/0.044")	Mtr.	600		

SR#	DESCRIPTION	UNIT	QTY	RATE (RS.)	AMOUNT (RS.)
11	P/F PVC doublelayer Switch kit Faceplate with specified switch holes i/c the cost of switches / sockets / dimmer made of Hi-Life / Bush / Schenider or approved equivalent manufacturer, screws complete as approved and directed by the Engineer Incharge				
	(a) One way Gange Switch (Small)(iv) Three pin Light Plug 10/13 Amp	no.	48		
	(a) One way Gange Switch (Small)(viii) Three Pin Power Plug 15-32 Amp	no.	18		
	(b) One way Gange Switch (Large)(iii) 06 Gange	no.	36		
12	P/F PVC concealed Switch kit Box i/c the cost of screws complete as approved and directed by the Engineer Incharge i) Small	no.	11		
	ii) Large	no.	720		
13	Providing and fixing Pakistan Energy Label NEECA approved (GFC Fan, Royal Fan, Pak Fan or Yunas Fan) Copper winded Exhaust Fan i/c the cost of necessary cable and hardware for connection from ceiling rose complete as approved and directed by Engineer Incharg a) Plastic body (ii) 12 " dia	no.	12		
14	Providing and fixing Pakistan Energy Label NEECA approved (GFC Fan, Royal Fan, Pak Fan or Yunas Fan) Copper winded Exhaust Fan i/c the cost of necessary cable and hardware for connection from ceiling rose complete as approved and directed by Engineer Incharg b) Steel body (ii) 18" sweep	no.	12		
15	Providing and fixing Pakistan Energy Label NEECA approved (GFC Fan, Royal Fan, Pak Fan or Yunas Fan) Copper winded wall bracket Fan i/c the cost of necessary cable and hardware for connection as approved and directed by Engineer Incharge. i) 18" Sweep dia	no.	18		
<b>SCHEDULE ITEMS TOTAL (Y)</b>					
<b>NON-SCHEDULE</b>					
1	Supplying, installation and commissioning of LED DOWN Light 24 WATT as approved and directed by the Engineer Incharge. Make. Philips				
	i) 8" LED DOWNLIGHT 24 W	no.	168		
<b>NON-SCHEDULE ITEMS TOTAL (Z)</b>					
<b>D- COMMON &amp; WASHROOM AREA - ELECTRICAL WORKS (SUB-TOTAL Y+Z)</b>					
<b>GRAND TOTAL (A+B+C+D)</b>					

**Note: The rates are inclusive of all applicable taxes (PST, GST and Income Tax etc)**

**The GRAND TOTAL will govern the most advantageous bidder in Lot-B.**

**Each LOT will be separately evaluated(both technical & financially) and separately awarded.**

**DESIGNING OF THE PROJECT “FACADE  
UP-GRADATION WORKS INCLUDING CIVIL WORKS),  
ELECTRICAL WORKS, EXTERNAL PAINTING AND  
PROVISION & INSTALLATION OF DIGITAL SIGNAGE,  
REHABILITATION OF COMMON AND WASHROOM  
AREAS ALONG WITH INSTALATION OF LIFT AND  
ALLIED WORKS,  
AT SLB MULTAN”**

**WASHROOM / BATH BLOCK AND  
COMMON AREA DRAWINGS**

**CLIENT:**

**STATE LIFE INSURANCE  
CORPORATION OF  
PAKISTAN**



**PROJECT**  
**DESIGNING OF THE**  
**PROJECT "FACADE**  
**UP-GRADATION WORKS**  
**INCLUDING CIVIL**  
**WORKS), ELECTRICAL**  
**WORKS, EXTERNAL**  
**PAINTING AND**  
**PROVISION &**  
**INSTALLATION OF**  
**DIGITAL SIGNAGE,**  
**REHABILITATION OF**  
**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALLATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN"**

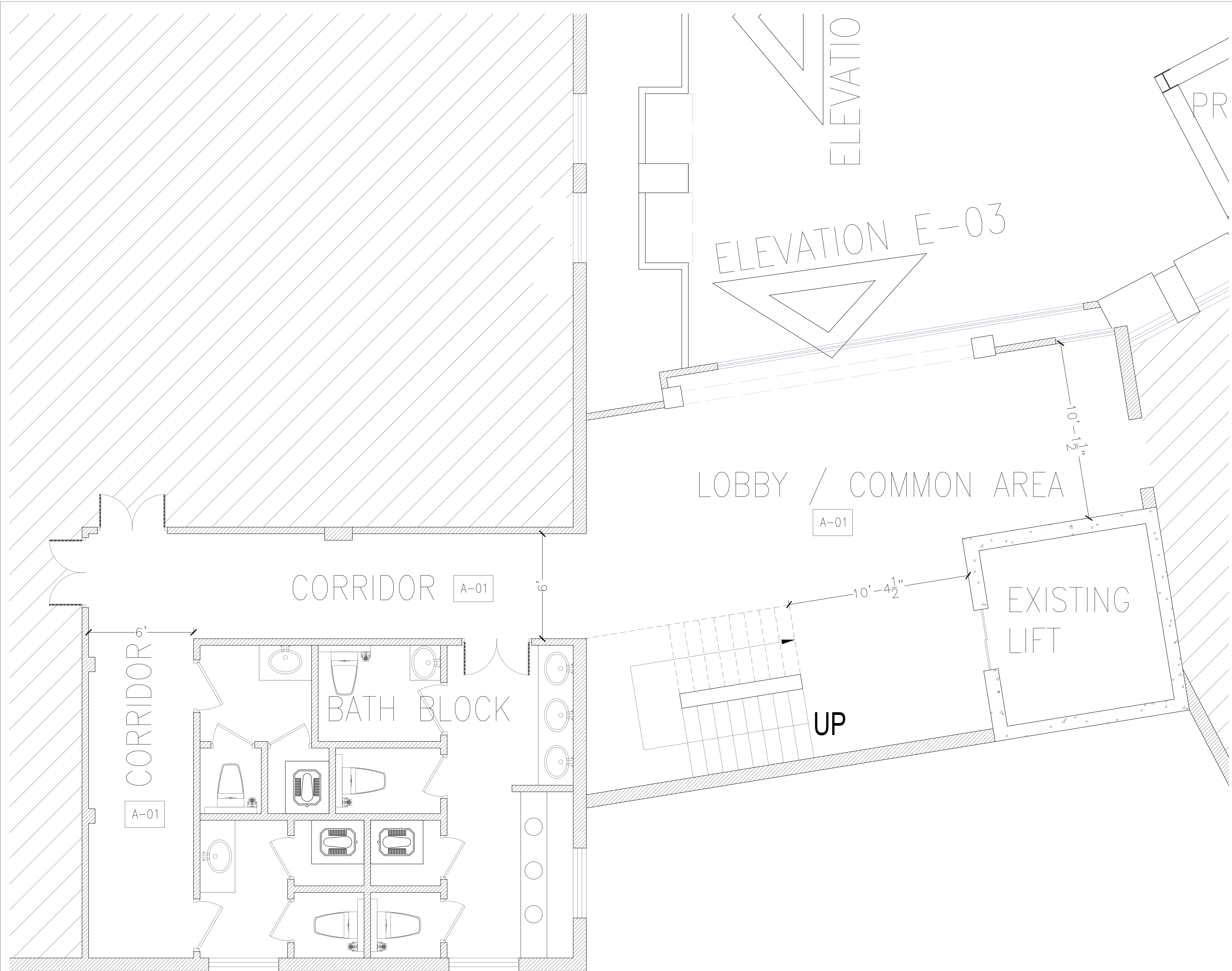
TITLE: GROUND FLOOR PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: C-01	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

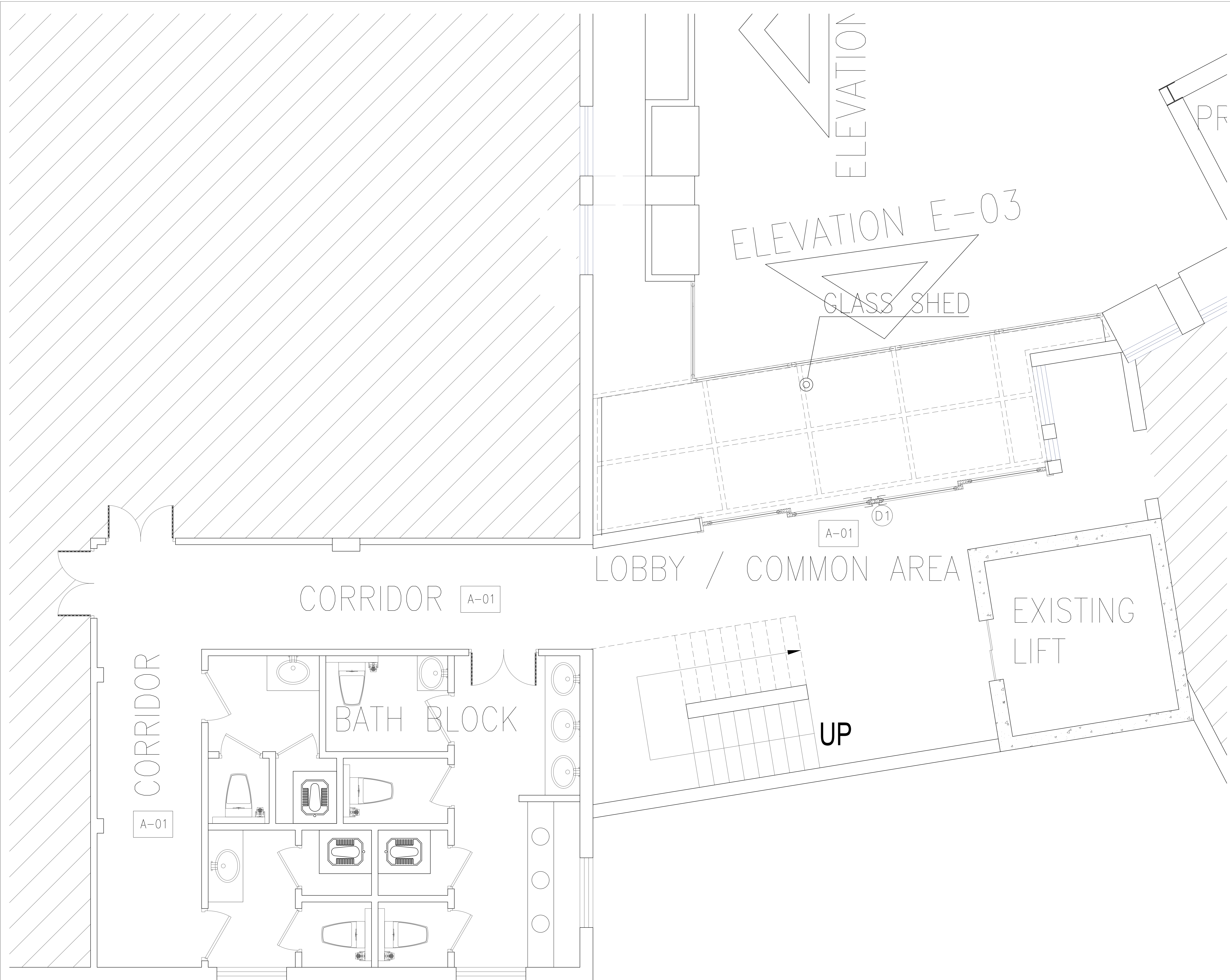
TO SKY

OPEN TO SKY



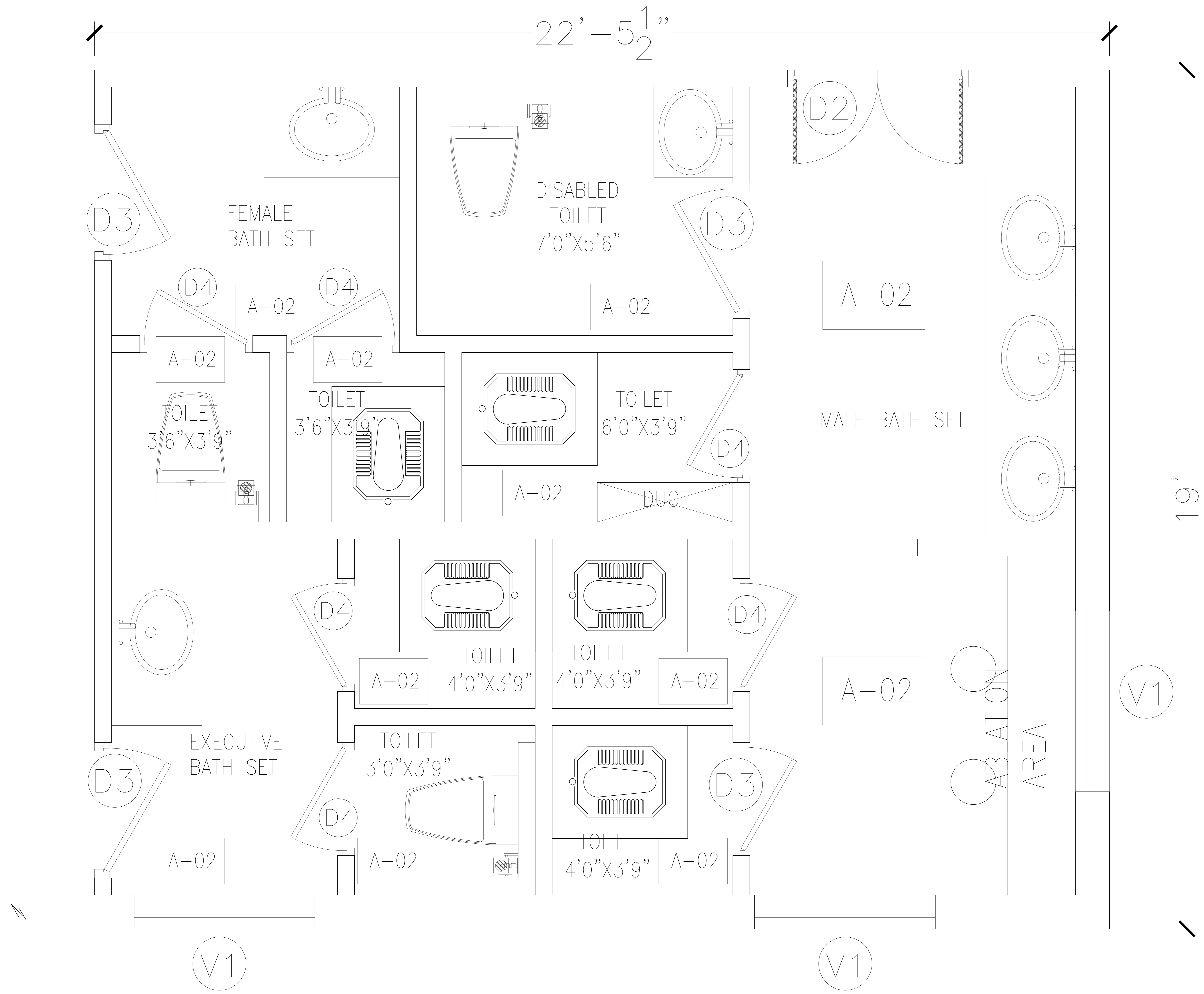
**PROJECT**  
**DESIGNING OF THE**  
**PROJECT "FACADE**  
**UP-GRADATION WORKS**  
**INCLUDING CIVIL**  
**WORKS), ELECTRICAL**  
**WORKS, EXTERNAL**  
**PAINTING AND**  
**PROVISION &**  
**INSTALLATION OF**  
**DIGITAL SIGNAGE,**  
**REHABILITATION OF**  
**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN"**

TITLE: 1ST TO 4TH FLOOR PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: C-02	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	<b>STATE LIFE INSURANCE CORPORATION OF PAKISTAN</b>
<b>BY:</b>	



**PROJECT**  
**DESIGNING OF THE**  
**PROJECT "FACADE**  
**UP-GRADATION WORKS**  
**INCLUDING CIVIL**  
**WORKS), ELECTRICAL**  
**WORKS, EXTERNAL**  
**PAINTING AND**  
**PROVISION &**  
**INSTALLATION OF**  
**DIGITAL SIGNAGE,**  
**REHABILITATION OF**  
**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN"**

TITLE: 5TH FLOOR PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: C-03	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	<b>STATE LIFE INSURANCE CORPORATION OF PAKISTAN</b>
<b>BY:</b>	



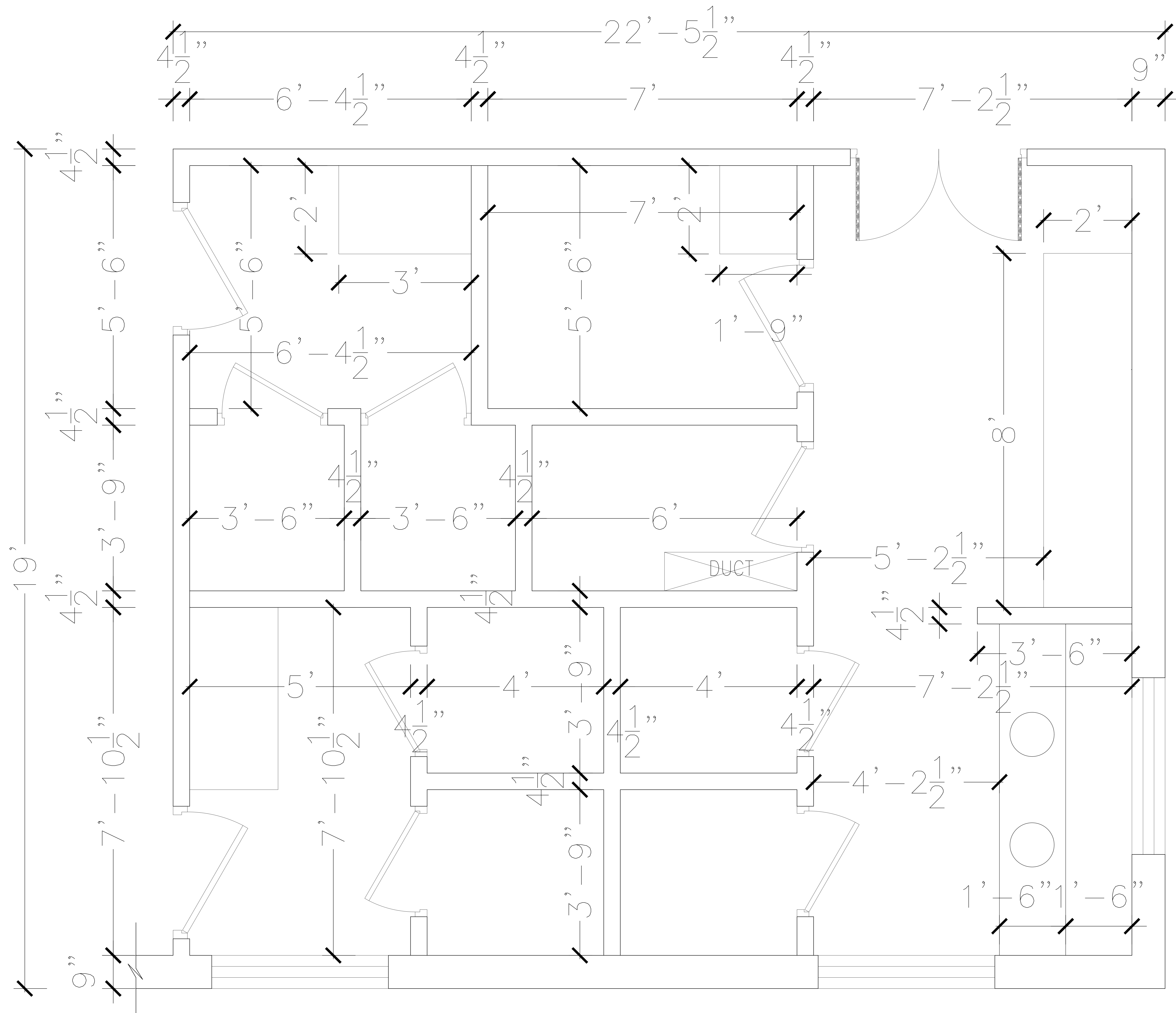
# BATH BLOCK PLAN

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: BATH BLOCK PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: B-01	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**



# BATH BLOCK LAYOUT PLAN

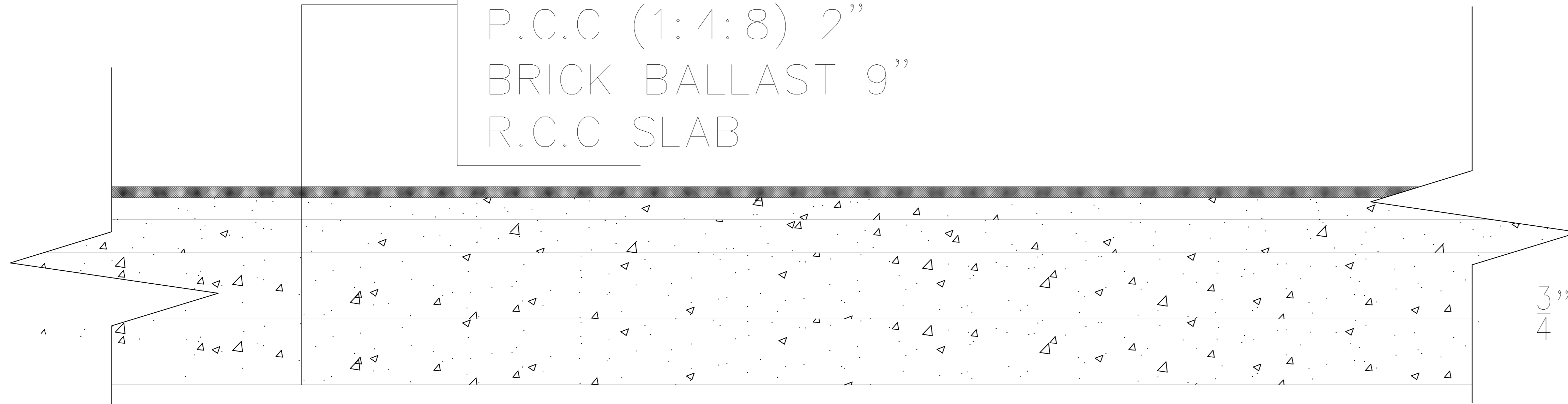
**PROJECT**  
**DESIGNING OF THE**  
**PROJECT "FACADE**  
**UP-GRADATION WORKS**  
**INCLUDING CIVIL**  
**WORKS), ELECTRICAL**  
**WORKS, EXTERNAL**  
**PAINTING AND**  
**PROVISION &**  
**INSTALLATION OF**  
**DIGITAL SIGNAGE,**  
**REHABILITATION OF**  
**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALLATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN"**

TITLE: BATH BLOCK LAYOUT PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: B-02	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

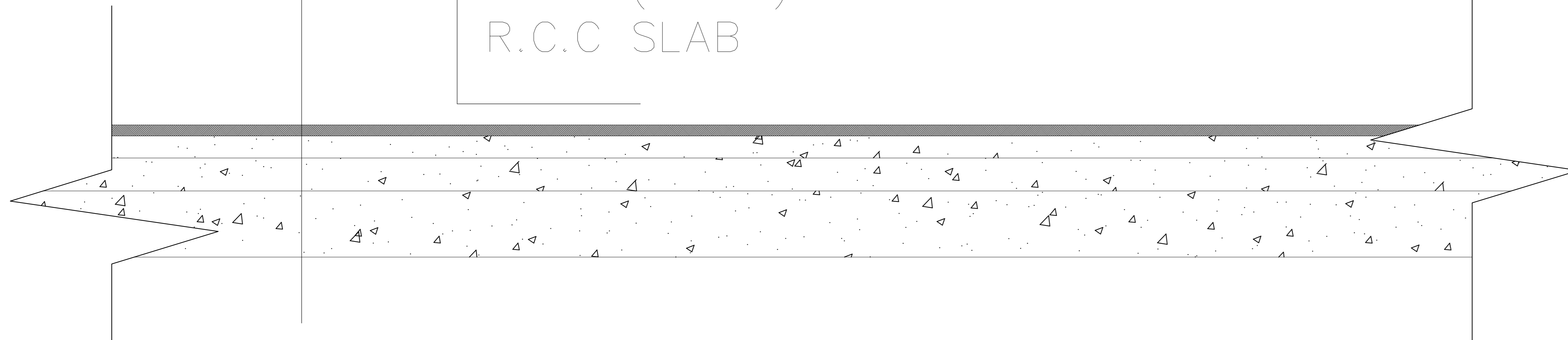
**BY:**

FLOORING.  
P.C.C (1:2:4) 2"  
P.C.C (1:4:8) 2"  
BRICK BALLAST 9"  
R.C.C SLAB

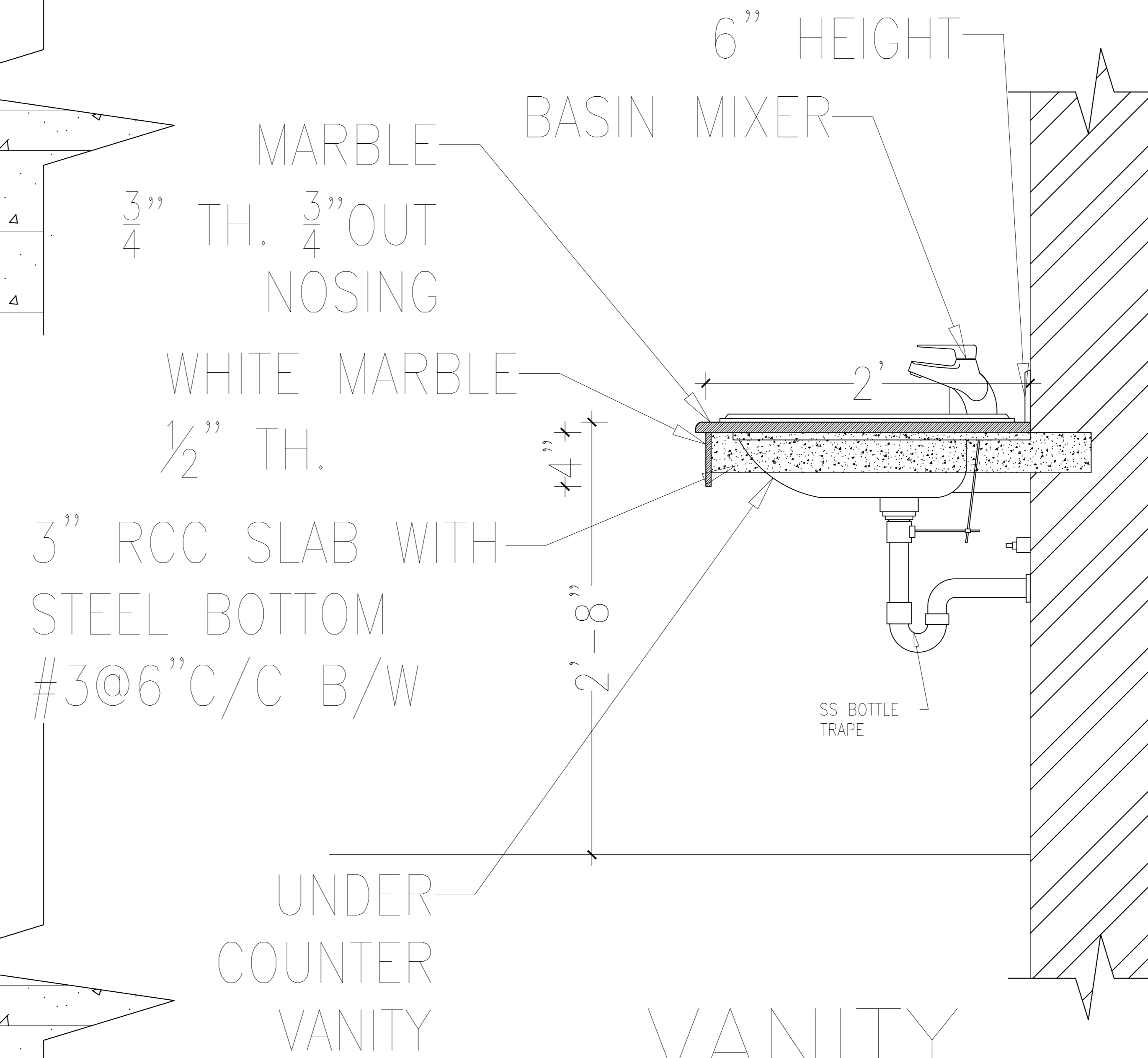


WASHROOM FLOORING

FLOORING.  
P.C.C (1:2:4) 2"  
P.C.C (1:4:8) 4"  
R.C.C SLAB



COMMON AREA FLOORING



VANITY (SECTION)

**PROJECT**  
**DESIGNING OF THE**  
**PROJECT "FACADE**  
**UP-GRADATION WORKS**  
**INCLUDING CIVIL**  
**WORKS), ELECTRICAL**  
**WORKS, EXTERNAL**  
**PAINTING AND**  
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**INSTALLATION OF**  
**DIGITAL SIGNAGE,**  
**REHABILITATION OF**  
**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN"**

TITLE: DETAILS	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: B-03	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

## SCHEDULE OF INTERNAL FINISHING

ITEM	DESCRIPTION	FLOOR		SKIRTING/DADO		CEILING
		Providing and laying superb quality Porcelain glazed tiles flooring of Master/ Stile brand or approved equivalent manufacturer of specified size in approved design,Color and Shade with adhesive/bond over 3/4"thick (1:3) cement plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respect as approved and directed by the Engineer Incharge a) Full body Glazed tiles (iii) 600mmx 600 mm	Providing and laying superb quality Ceramic tile floors of Master/ Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Textureof approved Color and Shadeas per approved design with adhesive bond, over 3/4" thick (1:2) cement sand plasteri/c the cost of sealer for finishing the joints i/c cutting grindingcomplete in all respects and as approved and directed by the Engineer Incharge i) 12"x18"/12"x24"/10"x24"/8"x24"/12"x36"	Providing and laying superb quality Porcelain glazed tiles of Master/ Stile brand or approved equivalent manufacturer, skirting/dado of specified size, Color and Shade with adhesive/ bond over 1/2"thick (1:2) cement plaster i/c the cost of matching sealer for finishing the joints, cutting grinding complete in all respect as approved anddirected by the Engineer Incharge. a) Full body Glazed tiles (ii) 600mmx 600 mm	Providing and laying superb quality Ceramic tiles dado of Master/ Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture skirting/dado of approved Color and Shade with adhesive bond over 1/2"thick (1:2) cement plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects as approved and directed by the Engineer Incharge i) 12"x18"/12"x24"/10"x24" /8"x24" /12"x36"	P/L false ceiling comprising of 5/8" thick plaster of paris sheet of required size in approved design with one line of 6" wide niche all around , hanging with Copper wire(16 SWG) duly enriched with POP and flaxen i/c thecost of making space for rope light /screws/jute/making holes for lights and rawal plugs complete in all respects as approved and directed by the Incharge.(Measurement will be made as per carpet Area)
A-01	COMMON AREA	●		●		●
A-02	WASHROOM AREAS		●		●	

## SCHEDULE OF WINDOWS/VENTILATORS AND DOORS

ITEM	SIZE	SILL LEVEL
V-1	4'-0" x 2'-0"	FFL + (6'-0")
D-1	20'-0" x 10'-0"	FFL + (10'-0")
D-2	4'-0" x 8'-0"	FFL + (8'-0")
D-3	3'-0" x 8'-0"	FFL + (8'-0")
D-4	2'-6" x 8'-0"	FFL + (8'-0")

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: SCHEDULE OF FINISHING AND DOOR, WINDOWS

DRAWN BY: ABDULLAH

CHECKED BY: ARCH. SHERAZ

COVERED AREA:

DRAWING NO: B-04

REV. NO:

DATE: 10-01-2026

ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

## SCHEDULE OF INTERNAL FINISHING

ITEM	DESCRIPTION	FLOOR		SKIRTING/DADO		CEILING
		Providing and laying superb quality Porcelain glazed tiles flooring of Master/ Stile brand or approved equivalent manufacturer of specified size in approved design,Color and Shade with adhesive/bond over 3/4"thick (1:3) cement plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respect as approved and directed by the Engineer Incharge a) Full body Glazed tiles (iii) 600mmx 600 mm	Providing and laying superb quality Ceramic tile floors of Master/ Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Textureof approved Color and Shadeas per approved design with adhesive bond, over 3/4" thick (1:2) cement sand plasteri/c the cost of sealer for finishing the joints i/c cutting grindingcomplete in all respects and as approved and directed by the Engineer Incharge i) 12"x18"/12"x24"/10"x24"/8"x24"/12"x36"	Providing and laying superb quality Porcelain glazed tiles of Master/ Stile brand or approved equivalent manufacturer, skirting/dado of specified size, Color and Shade with adhesive/ bond over 1/2"thick (1:2) cement plaster i/c the cost of matching sealer for finishing the joints, cutting grinding complete in all respect as approved anddirected by the Engineer Incharge. a) Full body Glazed tiles (ii) 600mmx 600 mm	Providing and laying superb quality Ceramic tiles dado of Master/ Stile brand or approved equivalent manufacturer of specified size,Glossy/Matt/Texture skirting/dado of approved Color and Shade with adhesive bond over 1/2"thick (1:2) cement plaster i/c the cost of sealer for finishing the joints i/c cutting grinding complete in all respects as approved and directed by the Engineer Incharge i) 12"x18"/12"x24"/10"x24" /8"x24" /12"x36"	P/L false ceiling comprising of 5/8" thick plaster of paris sheet of required size in approved design with one line of 6" wide niche all around , hanging with Copper wire(16 SWG) duly enriched with POP and flaxen i/c thecost of making space for rope light /screws/jute/making holes for lights and rawal plugs complete in all respects as approved and directed by the Incharge.(Measurement will be made as per carpet Area)
A-01	COMMON AREA	●		●		●
A-02	WASHROOM AREAS		●		●	

## SCHEDULE OF WINDOWS/VENTILATORS AND DOORS

ITEM	SIZE	SILL LEVEL
V-1	4'-0" x 2'-0"	FFL + (6'-0")
D-1	20'-0" x 10'-0"	FFL + (10'-0")
D-2	4'-0" x 8'-0"	FFL + (8'-0")
D-3	3'-0" x 8'-0"	FFL + (8'-0")
D-4	2'-6" x 8'-0"	FFL + (8'-0")

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: SCHEDULE OF FINISHING AND DOOR, WINDOWS

DRAWN BY: ABDULLAH

CHECKED BY: ARCH. SHERAZ

COVERED AREA:

DRAWING NO: B-04

REV. NO:

DATE: 10-01-2026

ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

# PLUMBING GENERAL NOTES

- NO WORK SHALL BE CARRIED OUT UNLESS SHOP DRAWINGS ARE SUBMITTED BY THE CONTRACTOR AND APPROVED BY THE CONSULTANT.
- CONTRACTOR SHALL COORDINATE ALL WORKS WITH SEWERAGE, STRUCTURAL & PLUMBING DRAWINGS.
- MECHANICAL SERVICES SHALL NOT CUT IN ANY STRUCTURAL BEAMS, RIBS OR ANY OTHER STRUCTURAL ELEMENTS UNLESS A PRIOR WRITTEN APPROVAL HAS BEEN TAKEN FROM THE ENGINEER.
- ALL EQUIPMENTS SHALL BE INSTALLED STRICTLY AS PER MANUFACTURER'S RECOMMENDATION.
- MECHANICAL CONTRACTOR SHALL PROVIDE SLEEVE ON ALL PIPES PENETRATING WALLS SLABS OR BEAMS
- ALL WORK SHALL CONFORM TO THE LATEST INTERNATIONAL BUILDING CODE, AND THE REQUIREMENTS OF LOCAL AUTHORITIES
- MANHOLE COVERS AND FRAMES ARE TO BE HEAVY DUTY IN TRAFFIC AREAS AND MEDIUM DUTY IN PEDESTRIAN AREAS.
- MANHOLES SHALL BE OF CONCRET/BRICK CONSTRUCTION.
- ALL UNDER GROUND SEWAGE PIPES SHALL HAVE A MINIMUM SLOPE OF 1%
- ALL PIPES UNDER TRAFFIC WILL HAVE MINIMUM 3' COVER OR WALL BE ENCASED IN CONCRETE
- ALL SANITARY APPLIANCES SHALL BE PROVIDED WITH TRAPS.
- JOINTS TO W.C. PANS SHALL BE WITH UPVC CONNECTORS & RUBBER GASKETS.
- ISOLATING VALVES SHALL BE PROVIDED TO SEPARATE THE INDIVIDUAL TOILETS, GATE VALVES SHALL BE PROVIDED TO/ FROM WATER HEATERS
- EXACT LOCATION OF WATER PIPE WORK SHALL BE DETERMINED ON SITE.
- PROVIDE ISOLATING VALVE ON ALL MAIN AND BRANCH LINES FOR MAINTENANCE.
- IN WATER SUPPLY SYSTEM THE PIPE DIAMETER INDICATED ARE NET FLOW AREAS (i.e. INTERNAL DIAMETERS) AND THE CONTRACTOR SHALL USE ADEQUATE PIPES SIZE, SPECIALLY WHEN USING PLASTIC PIPES TO ACCOUNT FOR PIPE WALL THICKNESS.
- CONTRACTOR TO PROVIDE OVERFLOW, TEST PIPE, WARNING LEVEL AND DRAIN CONNECTION.
- CONTRACTOR TO PROVIDE CLEAN OUTS AT EVERY 15 METER OF PIPE RUN EVEN IF IT IS NOT MENTIONED IN THE DRAWINGS.
- FOR COLD WATER SUPPLY PPR PN-20 PIPES SHALL BE USED.
- ALL EXPOSED COLD AND HOT WATER PIPING SHALL BE GI (ILL) MEDIUM CLASS.
- ALL HOT WATER PIPES SHALL BE PPR PN-20.
- ALL HOT WATER PIPES SHALL BE INSULATED.
- POSITION OF MANHOLE MAY BE CHANGED AS PER SITE REQUIREMENT.
- VENT PIPE WILL BE 3'-0" ABOVE TOP ROOF.
- POSITION OF W.Cs SHOULD BE KEPT BY CONSIDERING QIBLA DIRECTION.
- GAS BALL VALVE SHALL BE PROVIDED NEAR EVERY GAS BURNER & GAS HEATER POINT.
- GAS ON / OFF VALVE LEVERS SHALL BE INSTALLED IN THE DIRECTION i.e OPEN IN ANTI CLOCK WISE.
- WHEN GAS POINTS ARE NOT IN USE THESE SHALL BE PROPERLY PLUGGED TO AVOID LEAKAGE.
- NO JOINT SHALL BE ALLOWED IN THICKNESS OF WALL, PARTITION ,FLOORS AND CEILINGS.
- CONCEALED PIPE WORKS SHALL NOT BE SEALED UNTIL ALL INSPECTION/ TESTING HAS BEEN DONE.

## PLUMBING LEGEND

S.NO	DESCRIPTION	SYMBOL
1.	MAIN SEWERAGE LINE	
2.	SOIL WATER PIPE	SP
3.	WASTE WATER PIPE	WP
4.	RAIN WATER PIPE	RP
5.	MAIN WATER SUPPLY LINE	MWP
6.	COLD WATER SUPPLY	CW
7.	HOT WATER SUPPLY	HW
8.	FLOOR TRAPE/DRAIN	FD
9.	CLEAN OUT PLUG (FLOOR LEVEL)	COP
10.	WASTE WATER MANHOLE	WMH
11.	SOIL WATER MANHOLE	SMH
12.	RAIN WATER MANHOLE	RMH
13.	INSTANT GEYSER	
14.	GATE/STOP VALVE	GV
15.	OVER HEAD WATER TANK	OHWT
16.	UNDER GROUND WATER TANK	UGWT
17.	HOT WATER GEYSER	HWG
18.	VENT PIPE	VP
19.	FROM ABOVE	F/A
20.	TO ABOVE	T/A
21.	FROM BELOW	F/B
22.	TO BELOW	T/B
23.	UNDER FLOOR	U/F
24.	WATER CLOSET	WC
25.	WASH HAND BASIN	WHB
26.	SINK	
27.	SHOWER	SH
28.	WATER TAB	
29.	HIGH PRESSURE GAS LINE FROM EXISTING SOURCE OF SUPPLY	
30.	GAS LINE	S/G S/G S/G S/G
31.	GAS BALL VALVE	
32.	GAS AUDCO VALVE	
33.	GAS REGULATOR	
34.	GAS MAIN VALVE	
35.	GAS METER	GM
36.	GAS BURNER	
37.	GAS HEATER	G/H

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: PLUMBING GENERAL NOTES	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: P-01	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
<b>BY:</b>	

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## PLUMBING LEGEND

S.NO	DESCRIPTION	SYMBOL
1.	MAIN SEWERAGE LINE	
2.	SOIL WATER PIPE	SP
3.	WASTE WATER PIPE	WP
4.	RAIN WATER PIPE	RP
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10.	WASTE WATER MANHOLE	WMH
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25.	WASH HAND BASIN	WHB
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34.	GAS MAIN VALVE	
35.	GAS METER	GM
36.	GAS BURNER	
37.	GAS HEATER	G/H

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: PLUMBING GENERAL NOTES

DRAWN BY: ABDULLAH

CHECKED BY: ARCH. SHERAZ

COVERED AREA:

DRAWING NO: P-01

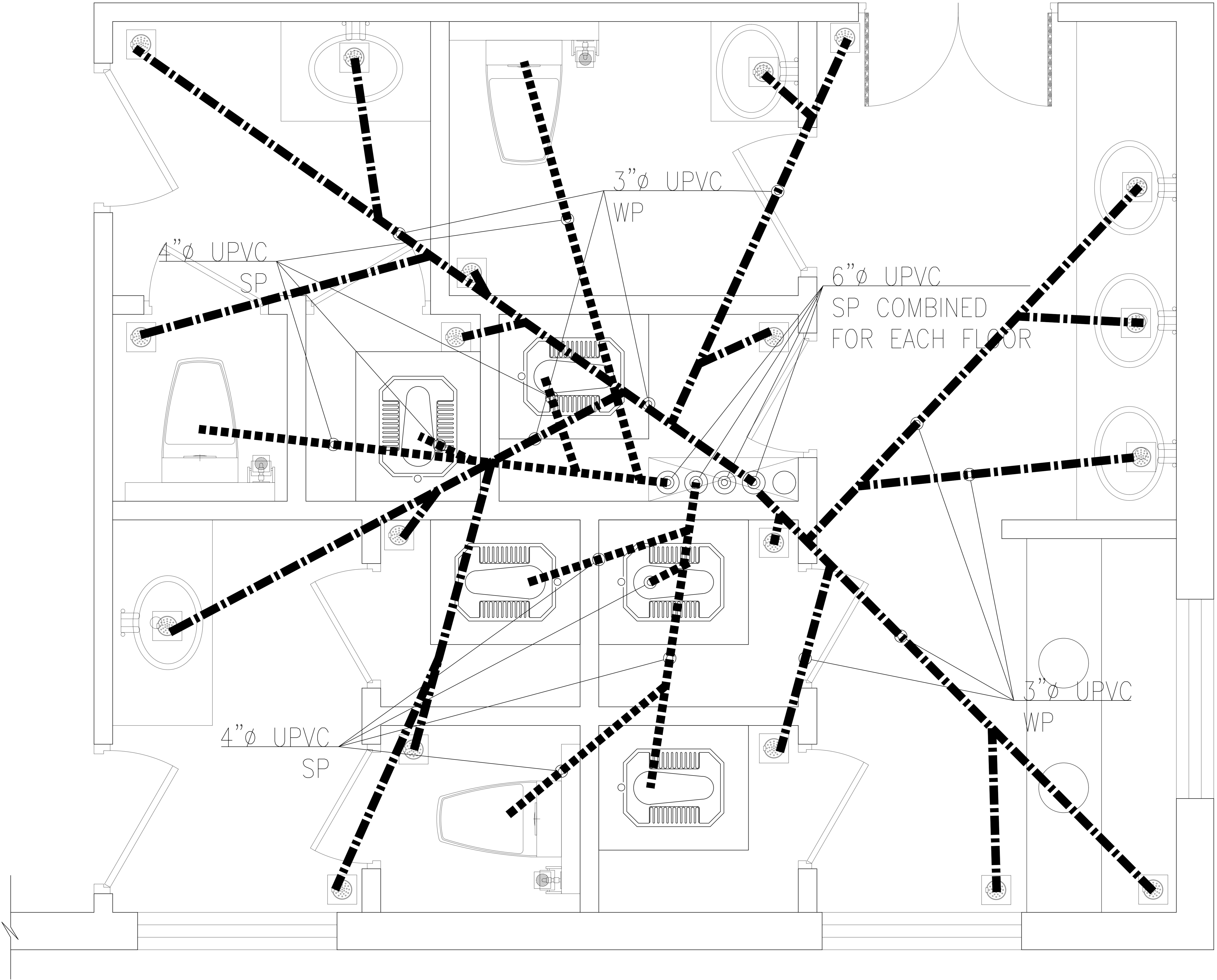
REV. NO:

DATE: 10-01-2026

ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

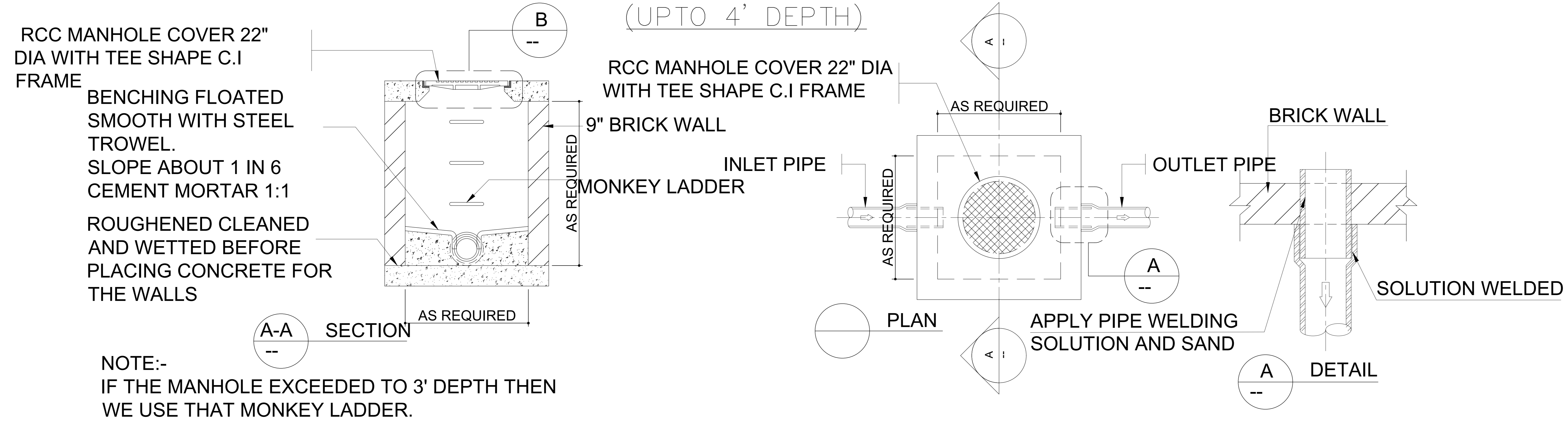


# WASHROOM AREA SEWERAGE PLAN

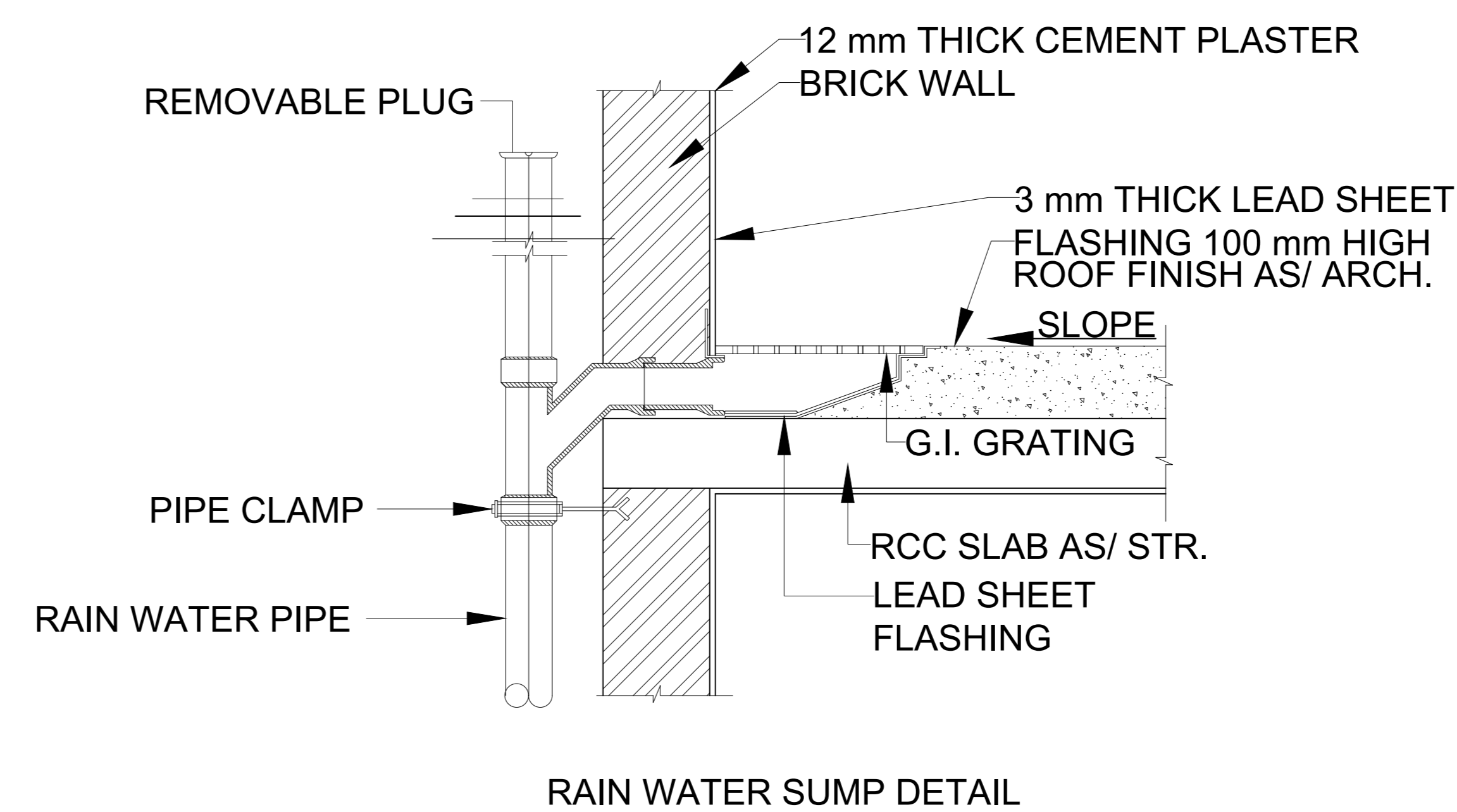
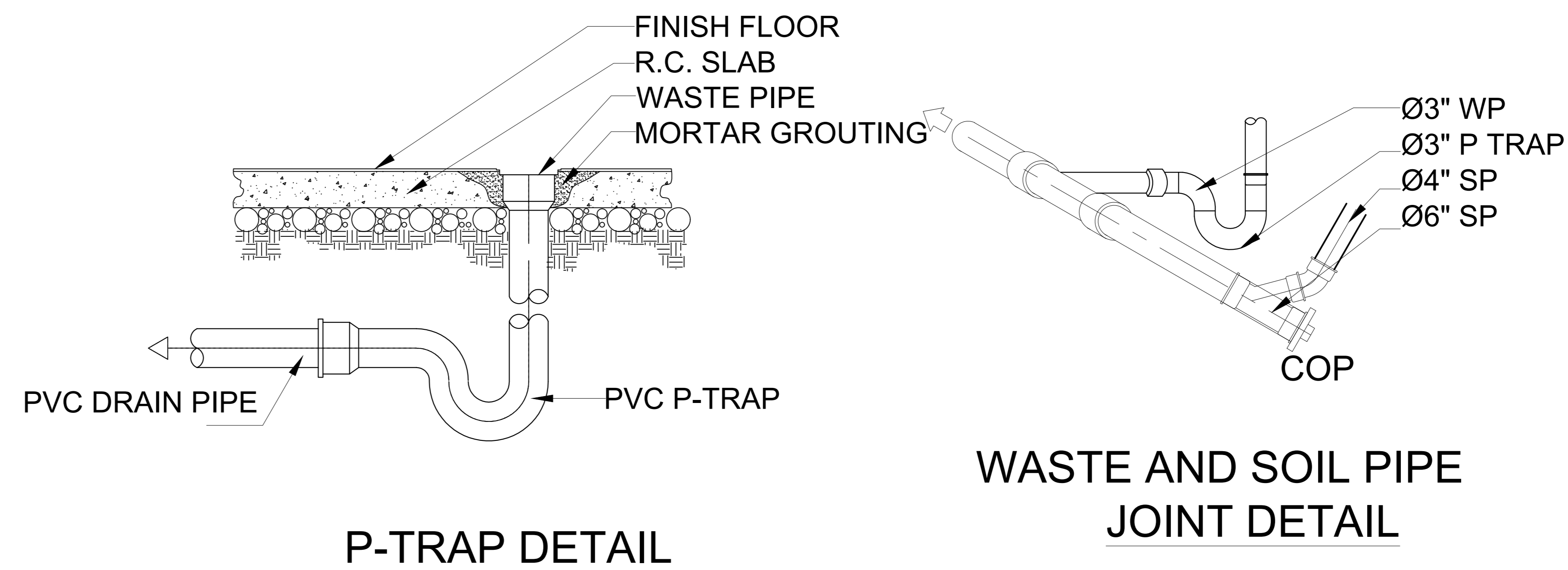
**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: BATH BLOCK SEWERAGE PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: P-03	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
<b>BY:</b>	

# MANHOLE DETAIL-1



SLOPE FOR SEWER		
DIAMETER	MATERIAL	SLOPE
3"	uPVC	1:70
4"	uPVC	1:100
6"	uPVC	1:150
10"	uPVC	1:230
12"	PVC	1:350
9"	RCC	1:200
12"	RCC	1:330
15"	RCC	1:450
18"	RCC	1:550
21"	RCC	1:700
24"	RCC	1:830



**PROJECT**  
DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"

TITLE:	TYP. DETAILS
DRAWN BY:	ABDULLAH
CHECKED BY:	ARCH. SHERAZ
COVERED AREA:	
DRAWING NO:	REV. NO:
P-04	
DATE:	ISSUED FOR:
10-01-2026	
<b>CLIENT:</b>	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
<b>BY:</b>	

# GENERAL NOTES:—

## A LEGEND.

1 REFER TO LEGEND FOR THOSE SYMBOLS ONLY MENTIONED ON ALL LAYOUT PLANS. OTHER SYMBOLS SHOWN IN LEGEND BUT NOT ACTUALLY SHOWN ON LAYOUT DRAWINGS MAY PLEASE BE IGNORED.

## B ELECTRICAL WORKS.

1 THE FOLLOWING NOTES SHALL IN GENERAL APPLY TO ALL ELECTRICAL DRAWINGS. THE INSTRUCTIONS IN THESE NOTES SHALL BE FOLLOWED UNLESS STATED OTHERWISE.

ALL ELECTRICAL WORKS PERTAINING TO WIRING OF ELECTRICAL SYSTEMS SHALL STRICTLY CONFORM TO I.E.E LATEST EDITION OF RULES & REGULATIONS.

## 2 ELECTRICAL DRAWINGS

ALL ELECTRICAL DRAWINGS SHALL BE READ IN CONJUNCTION WITH BOQ, TECHNICAL SPECIFICATIONS AND IN CO-ORDINATION WITH ARCHITECTURAL, STRUCTURAL, PLUMBING AND HVAC DRAWINGS.

## 3 DIMENSIONS ON ELECTRICAL LAYOUT PLANS

ALL DIMENSIONS IF SHOWN ON THE ELECTRICAL LAYOUT PLANS ARE APPROXIMATE. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO DO ALL NECESSARY CALCULATIONS TO ARRIVE AT THE ACTUAL DIMENSIONS/MEASUREMENTS IN CO-ORDINATION WITH ALL OTHER RELEVANT DRAWINGS OF OTHER SERVICES.

## 4 SHOP DRAWINGS

THE ELECTRICAL CONTRACTOR SHALL PREPARE ELECTRICAL SHOP DRAWINGS WITH ALL NECESSARY RELEVANT DETAILS. THE SHOP DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR APPROVAL BEFORE THE COMMENCEMENT OF ANY WORKS AT SITE.

## 5 CO-ORDINATION

THE ELECTRICAL CONTRACTOR SHALL DO ALL NECESSARY CO-ORDINATION OF ELECTRICAL WORKS AND ALLIED SYSTEMS WITH ALL OTHER SERVICES AT SITE.

## 6 BALANCING OF ELECTRICAL LOADS

ELECTRICAL LOADS ON ALL 3 PHASES SHALL BE BALANCED ON THE ELECTRICAL WORKS AT THE TIME OF TESTING AND COMMISSIONING OF THE ELECTRICAL INSTALLATIONS.

## 7 ELECTRICAL WIRING.

ALL WIRING SHALL BE DONE IN PVC CONDUIT TO BE CONCEALED IN WALLS,SLABS,COLUMNS AND FLOORS OR AS SHOWN ON DRAWINGS.

8 THE WIRING SHOULD BE STARTED ONLY AFTER THE CONDUIT SYSTEM HAS BEEN COMPLETED AND ALL OUTLET BOXES ARE FIXED AT THEIR RESPECTIVE POSITIONS.

## 9 PVC CONDUITS.

ALL PVC CONDUIT SHALL BE OF 3/4" OR 1" DIA (DEPENDING UPON NUMBER OF WIRES) FROM SWITCH BOARD TO LIGHT POINTS & 1" DIA FROM DBs TO SWITCH BOARDS AND POWER SOCKETS OR AS SHOWN ON DRAWINGS.

## 10 LUBRICATION.

NO LUBRICATION EXCEPT AS RECOMMENDED BY MANUFACTURER SHALL BE USED FOR PULLING OF WIRES IN PVC CONDUITS.

NO OIL OF ANY KIND SHALL BE USED.

## 11 COLOUR CODING

COLOUR CODING FOR WIRING SHALL BE AS FOLLOWS: RED,YELLOW AND BLUE FOR PHASES, BLACK FOR NEUTRAL AND GREEN / YELLOW FOR CPC (EARTH).

## 12 SIZE OF WIRES

FOLLOWING SIZES OF PVC INSULATED WIRES WITH COPPER CONDUCTORS SHALL BE USED FOR INTERNAL WIRING,UNLESS STATED OTHERWISE.

12.1 1.5mm sq PVC INSULATED WIRES SHALL BE USED FROM SWITCH BOARD TO LIGHT POINTS AND 5 Amps SOCKETS OR AS SPECIFIED IN B.O.Q

12.2 2.5mm sq PVC INSULATED WIRES SHALL BE USED FROM DB TO SWITCH BOARDS FOR LIGHTING CIRCUITS.

12.3 4mm sq OR 6mm sq PVC INSULATED WIRES OR AS SHOWN ON DRAWING/BOQ SHALL BE USED FOR WIRING FROM DB TO POWER SOCKETS.

## 12.4 BACK BOXES

ALL BACK BOXES FOR SWITCHES & SOCKETS SHALL MADE OF M.S SHEET 16SWG OR AS SPECIFIED IN BOQ WITH EARTH TERMINAL. SIZE OF BACK BOX SHALL CORRESPOND TO THE SIZE OF SWITCHES/SOCKETS.

**PROJECT**  
**DESIGNING OF THE**  
**PROJECT "FACADE**  
**UP-GRADATION WORKS**  
**INCLUDING CIVIL**  
**WORKS), ELECTRICAL**  
**WORKS, EXTERNAL**  
**PAINTING AND**  
**PROVISION &**  
**INSTALLATION OF**  
**DIGITAL SIGNAGE,**  
**REHABILITATION OF**  
**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN"**

TITLE: ELECTRICAL GENERAL NOTES  
DRAWN BY: SAIM  
CHECKED BY: ARCH. SHERAZ  
COVERED AREA:  
DRAWING NO: E-01  
REV. NO:  
DATE: 10-01-2026  
ISSUED FOR:  
**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

**13** EARTHING OF POINTS.

ALL ELECTRICAL AND POWER SOCKETS SHALL BE PROPERLY EARTHED WITH 2.5mm sq PVC INSULATED WIRES OF COLOUR GREEN-YELLOW.

**14** CAPACITY OF CONDUITS.

THE NUMBER OF WIRES TO BE PULLED IN ANY CONDUIT FOR WIRING PURPOSES SHALL CONFORM TO I.E.E RULES & REGULATIONS

**15** CONDUIT FOR LIGHT WIRING.

WIRING SHALL BE DONE IN 3/4" & 1" DIA PVC CONDUIT FOR LIGHT POINTS AND CIRCUIT WIRING ON NORMAL/ GENERATOR SUPPLY OR AS SPECIFIED IN BOQ OR AS SHOWN ON DRAWINGS.

**16** DISTRIBUTION BOARDS "LIGHT" & "POWER"

ALL DISTRIBUTION BOARDS SHOWN ON DRAWINGS SHALL BE CONCEALED IN WALL & INSTALLED AT 4'-0" (1000mm) F.F.L OR AS SHOWN IN LEGEND/DRAWINGS.

**17** WIRING SYSTEM

LOOPING IN SYSTEM SHALL BE EMPLOYED FOR WIRING OF ALL LIGHT POINTS, FAN POINTS, EXHAUST FANS ETC. PHASE WIRE SHALL BE LOOPED AT SWITCH WHEARAS NEUTRAL AND EARTH WIRES SHALL BE LOOPED AT POINTS ON SLAB OR WALL

**C** TELEPHONE CONDUIT

**1** PVC CONDUIT SHALL BE 1"(25mm) DIA FOR WIRING OF TELEPHONE POINTS,PVC CONDUIT SHALL BE BURIED IN FLOOR /SLAB & WALLS FROM TDBs TO TELEPHONE POINTS, OR AS SHOWN ON DRAWINGS./B.O.Q

**D** FIRE ALARM WIRING.

**1** PVC CONDUIT SHALL BE 1"(25mm) DIA FOR WIRING OF FIRE ALARM POINTS,PVC CONDUIT SHALL BE BURIED IN FLOOR /SLAB & WALLS FROM FACP TO FIRE ALARM POINTS, OR AS SHOWN ON DRAWINGS./B.O.Q

FIRE ALARM JUNCTION BOX (FAJB).

**2** M.S JUNCTION BOX 9"x6"x4"DEEP 16 SWG WITH COVER CONCEALED IN WALL AT 9"BELOW SLAB TO FACILITATE PULLING OF FIRE ALARM CABLES.

**E** CLOSE CIRCUIT TV (CCTV) WIRING.

**1** PVC CONDUIT SHALL BE 1"(25mm) DIA FOR WIRING OF CCTV SYSTEM.PVC CONDUIT SHALL BE BURIED IN SLAB , WALLS & COLUMNS OR AS SHOWN ON DRAWING/BOQ

CLOSE CIRCUIT TV JUNCTION BOX (CCJB).

**2** M.S JUNCTION BOX 9"x6"x4"DEEP 16 SWG WITH COVER CONCEALED IN WALL AT 9"BELOW SLAB TO FACILITATE PULLING OF CLOSE CIRCUIT TV CABLES.

**F** OTHER SYSTEMS.

**1** 1" DIA PVC CONDUIT SHALL BE USED FOR WIRING OF ALL OTHER SYSTEMS UNLESS OTHERWISE MENTIONED ON PLANS OR AS SPECIFIED IN B.O.Q

**G** ELECTRICAL CONSULATANT.

**1** ELECTRICAL CONTRACTOR TO CONSULT ELECTRICAL CONSULTANT/ENGINEER FOR ANY FURTHER CLARIFICATIONS. NO ASSUMPTIONS SHOULD BE MADE.

**H** CO-ORDINATION.

NECESSARY CO-ORDINATION SHALL BE CARRIED OUT BY ELECTIRCAL CONTRACTOR WITH ALL OTHER SERVICES.

**I** MEASURMENTS.

MEASURMENTS AND DIMENSIONS ON DRAWINGS ARE APPROXIMATE. ELECTRICAL CONTRACTOR TO STUDY ALL RELEVANT PLANS FOR DIMENSIONS ETC.

**J** SHOP DRAWINGS.

CONTRACTOR SHALL PREPARE DETAILED WORKING DRAWINGS FOR ELECTRICAL AND ALL OTHER ALLIED SYSTEMS BEFORE EXECUTION OF WORKS AT SITE.

**K** PLUGGING OF CONDUITS.

ALL PVC CONDUITS AND PIPES SHALL BE PLUGGED WITH BITUMENOUS HESSIAN FROM BOTH ENDS AND JOINTS TO BE PROPERLY SEALED TO AVOID INGRESS OF WATER

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: ELECTRICAL GENERAL NOTES	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-02	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	<b>STATE LIFE INSURANCE CORPORATION OF PAKISTAN</b>

**BY:**

LIGHT FIXTURES

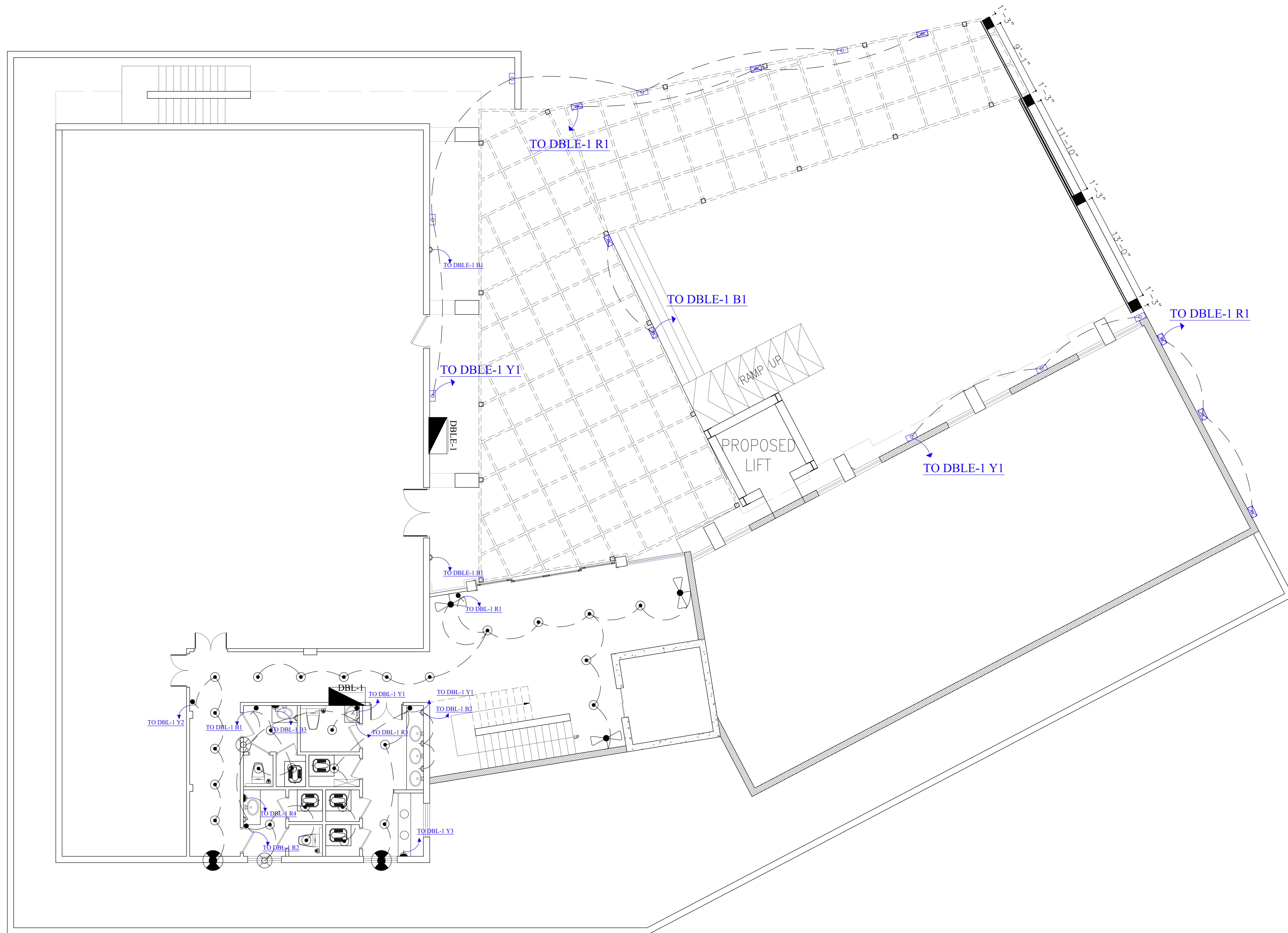
	SYMBOLS	DESCRIPTION	MOUNTING HEIGHT
1		2 FT LONG, UV LIGHT	ON SLAB
2		RECESSED TYPE 2'X2' PANEL, WITH 28 WATTS SMD MAKE PHILIPS	ON SLAB
3		13 WATT LED BULB WALL MOUNTED	ON WALL
4		CEILING FAN POINT 56" SWEEP WITH M.S HOOK	ON SLAB
5		WALL BRACKET FAN	ON WALL
6		DISTRIBUTION BOARD FOR LIGHTING CIRCUIT & SMALL POWER	1800mm from F.F.L to top of DB
7		MAIN PANEL AND SUB MAIN PANEL BOARD	ON FLOOR
8		Ledinaire Wall-mounted WL060V 11 WATT	ON WALL
9		DOWN LIGHT FIXTURE WITH 24 W SMD MAKE PHILIPS	ON SLAB
10		EXHAUST FAN PLASTIC BODY 12" DIA WITH LOUVERS	AS REQ.
11		EXHAUST FAN STEEL BODY 18" DIA WITH LOUVERS	AS REQ.
12		SmartBright LED Floodlight, 4300 lm, 50 W MAKE PHILIPS	AS REQ.
13		LED Floodlight, 22000 lm 200W, 757 cool white	AS REQ.

WIRING ACCESSORIES

S.NO	SYMBOLS	DESCRIPTION	MOUNTING HEIGHT
1		10 AMPS, ONE WAY AND TWO WAYS GANG TYPE SWITCH NUMBER OF SWITCHES ON SWITCH PLATE	1300mm F.F.L
2		15 AMP UNIVERSAL/MULTI PIN SWITCH SOCKET	250mm FROM WORK TOP
3		16/20 AMP UNIVERSAL/MULTI PIN SWITCH SOCKET	250mm FROM WORK TOP
4		32 AMP THREE PIN SWITCH SOCKET	1300mm F.F.L
5		16/20 AMP UNIVERSAL/MULTI PIN SWITCH SOCKET	1300mm F.F.L
6		15 AMPS 3-ROUND PIN SWITCH SOCKET	400mm F.F.L
7		15 AMPS 3-ROUND PIN SWITCH SOCKET	1300mm F.F.L
8		16/20 AMPS 3-ROUND PIN SWITCH SOCKET	2200mm F.F.L
9		FLOOR BOX WITH COVER QUALITY IP-66	IN FLOOR
10		WIRING IN 25mm DIA PVC CONDUIT	IN WALL, SLAB OR FLOOR
11		16/20 AMPS 3-ROUND PIN SWITCH SOCKET	2100mm F.F.L
12		FLOOR BOX WITH COVER QUALITY IP-66	IN FLOOR

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: ELECTRICAL LEGENDS	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-03	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
<b>BY:</b>	



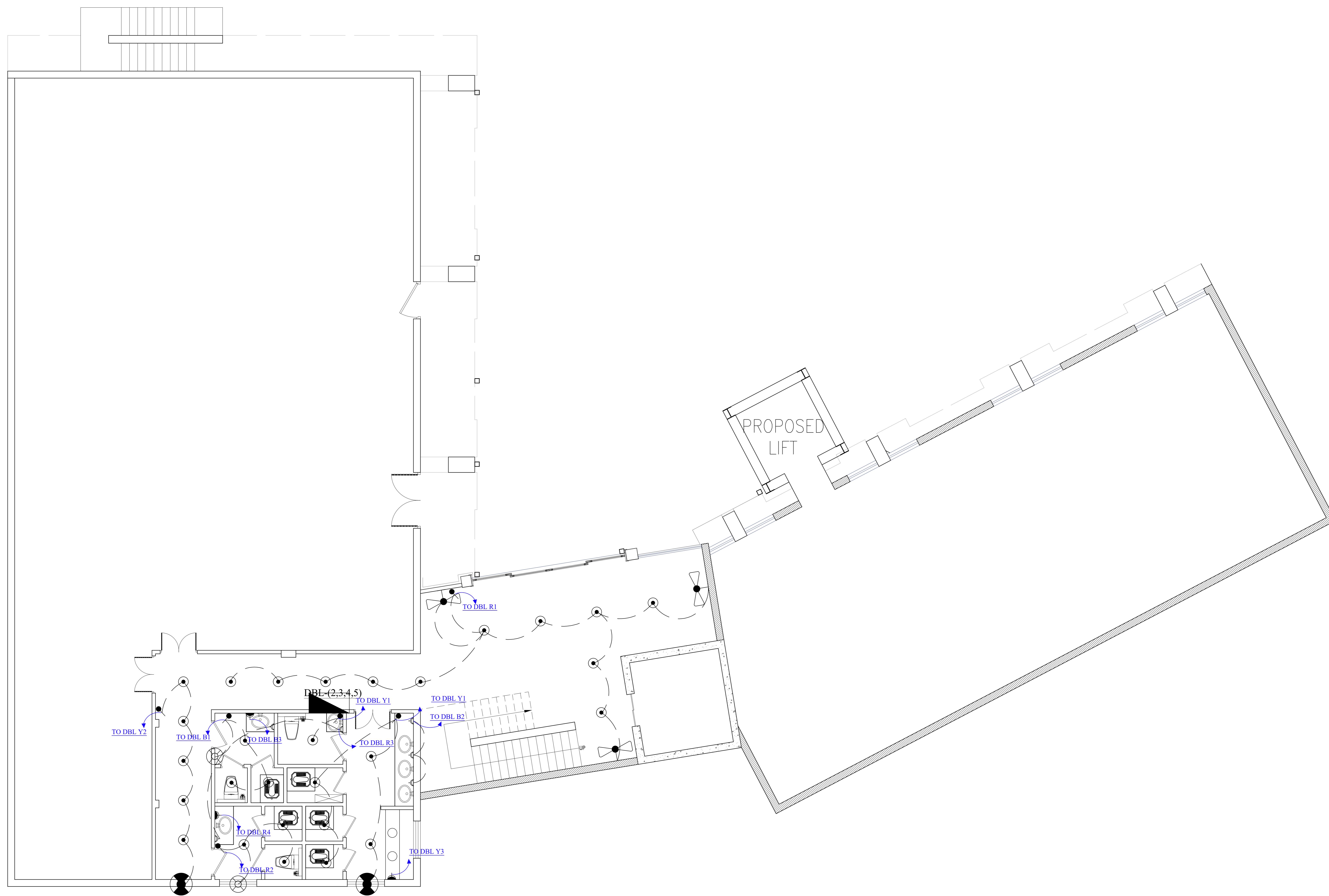
**GROUND FLOOR ELECTRICAL PLAN**

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: GROUND FLOOR ELECTRICAL PLAN	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-04	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

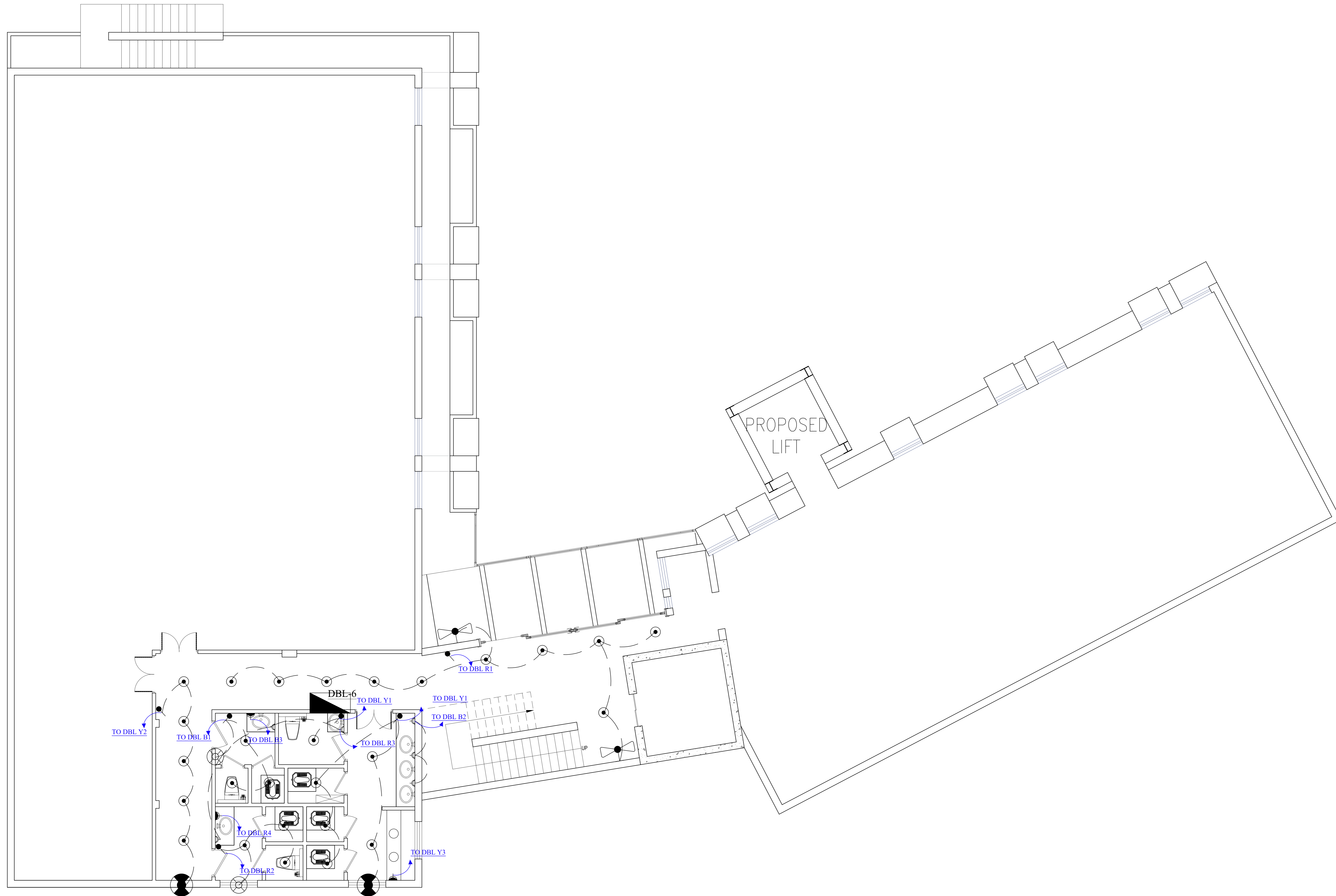
**BY:**



1ST to 4TH FLOOR PLAN

**PROJECT**  
**DESIGNING OF THE**  
**PROJECT "FACADE**  
**UP-GRADATION WORKS**  
**INCLUDING CIVIL**  
**WORKS), ELECTRICAL**  
**WORKS, EXTERNAL**  
**PAINTING AND**  
**PROVISION &**  
**INSTALLATION OF**  
**DIGITAL SIGNAGE,**  
**REHABILITATION OF**  
**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALLATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN"**

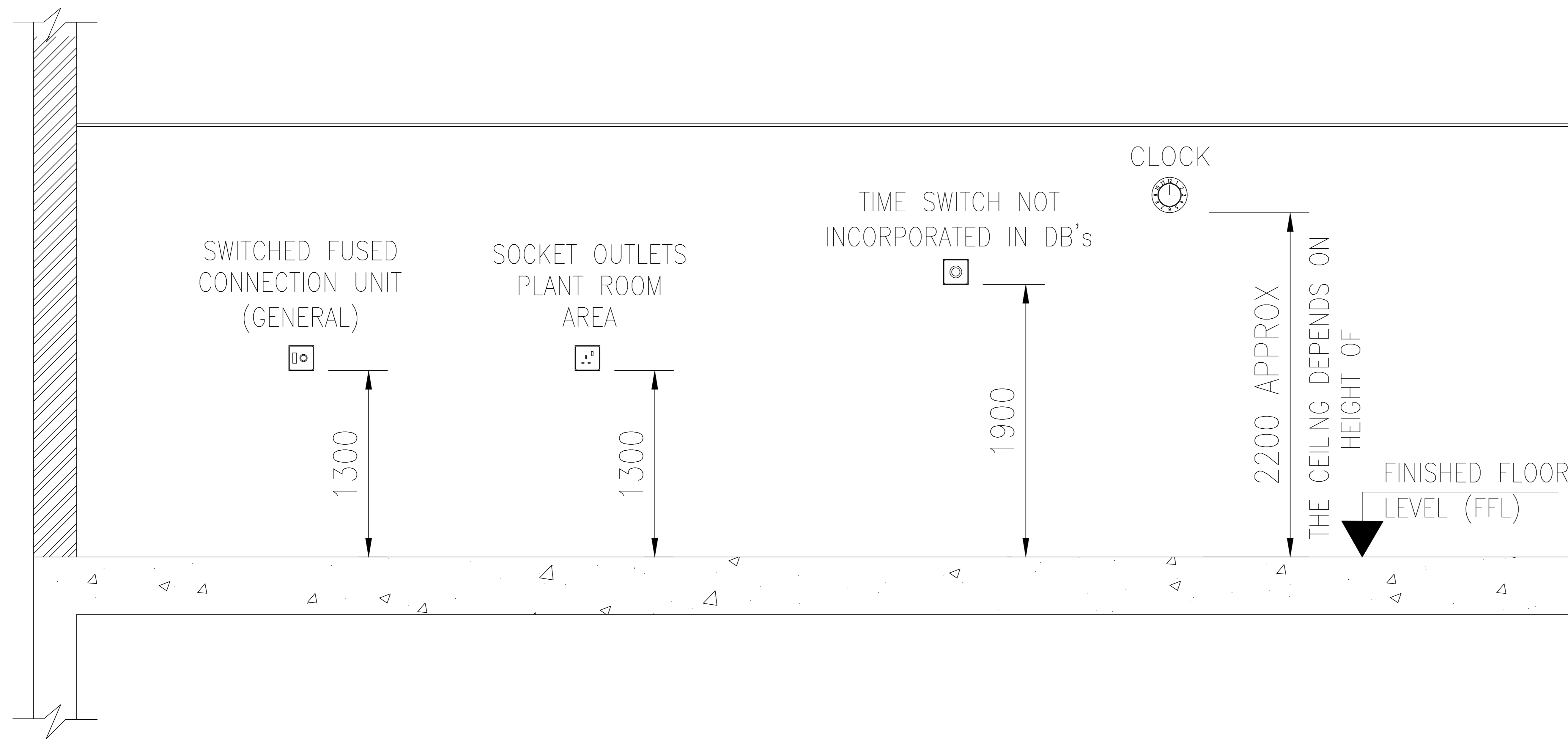
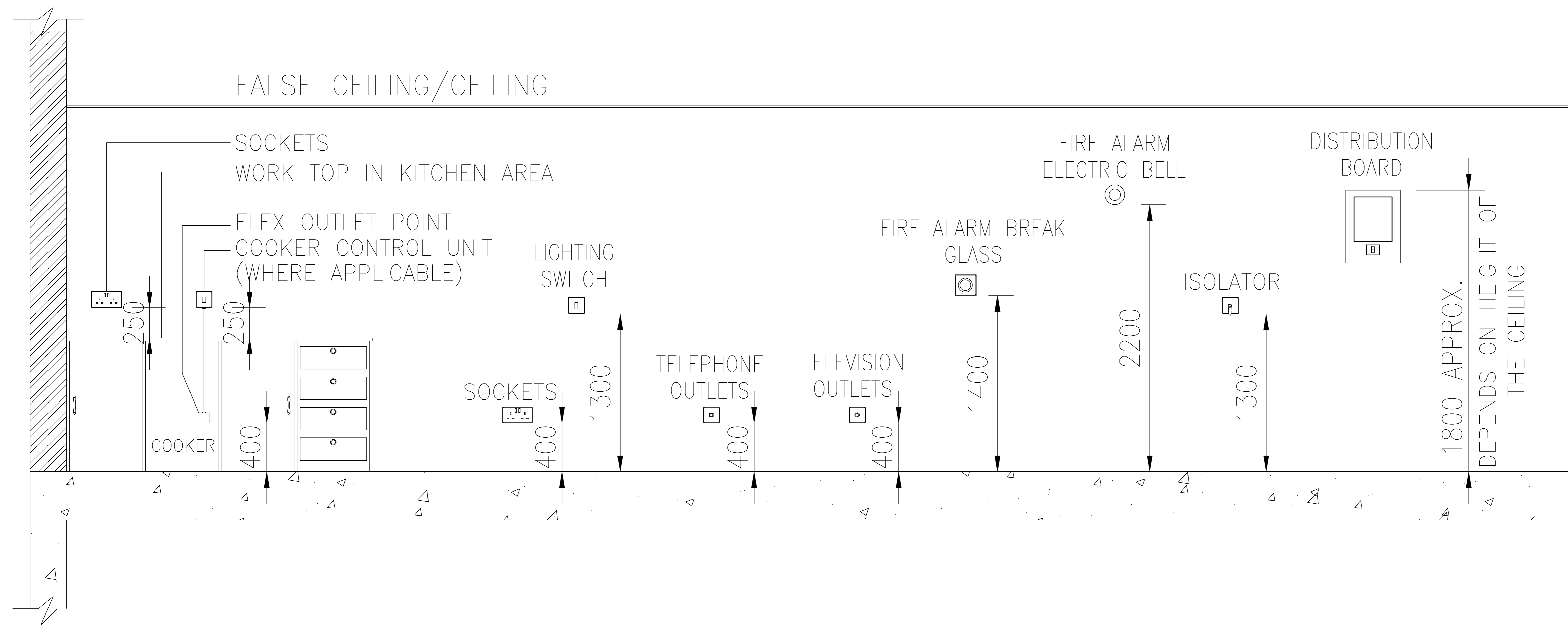
TITLE: 1ST TO 4TH FLOOR ELECTRICAL PLAN	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-06	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
<b>BY:</b>	



**5TH FLOOR PLAN**

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: 5TH FLOOR ELECTRICAL PLAN	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-07	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
<b>BY:</b>	



STANDARD MOUNTING HEIGHTS OF ELECTRICAL ACCESSORIES

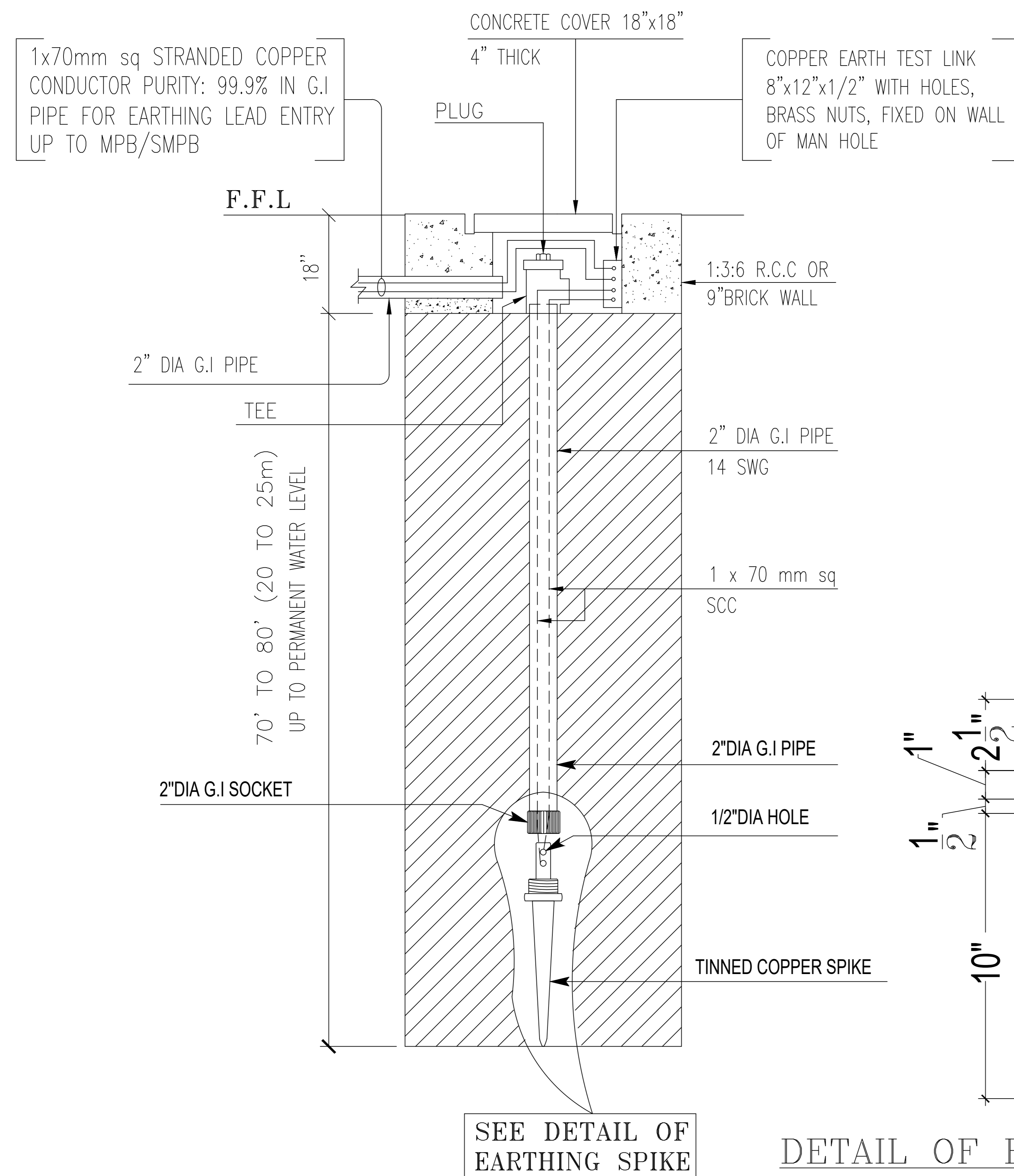
**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: ELECTRICAL MOUNTING HEIGHTS	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-08	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

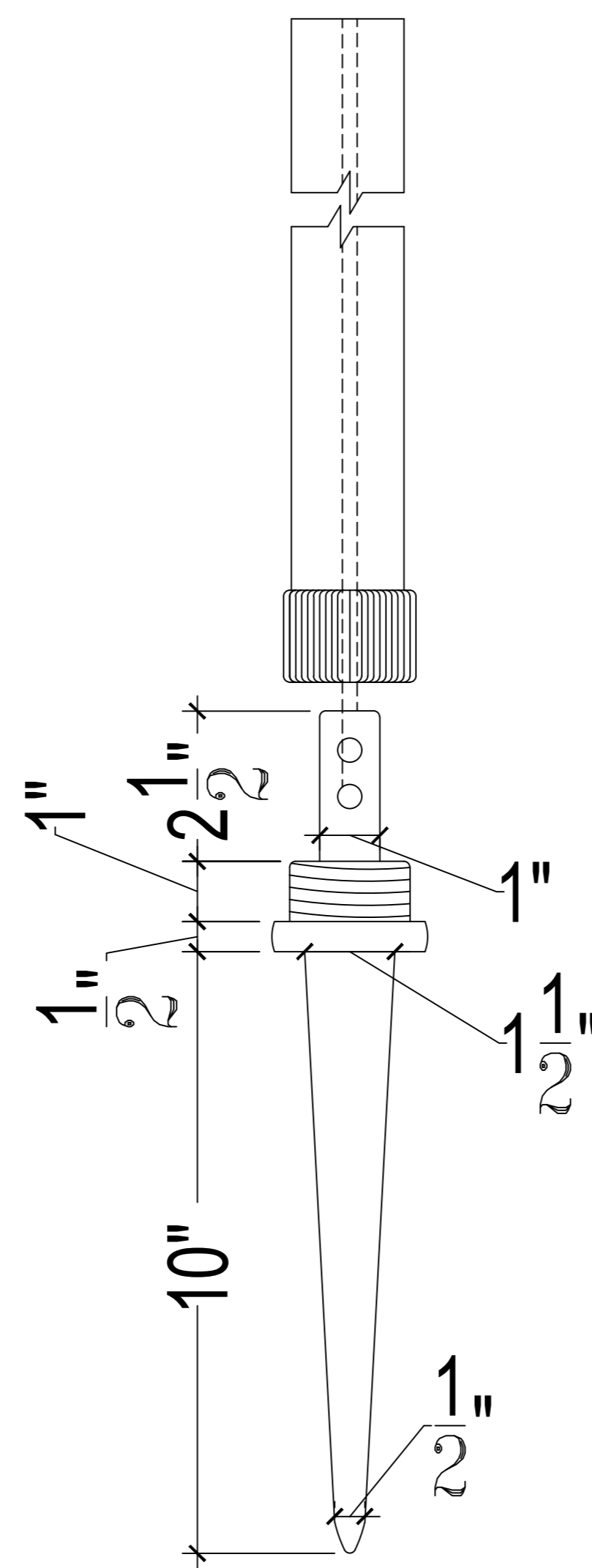
**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

DETAIL : A  
EARTHING SYSTEM BORE TYPE



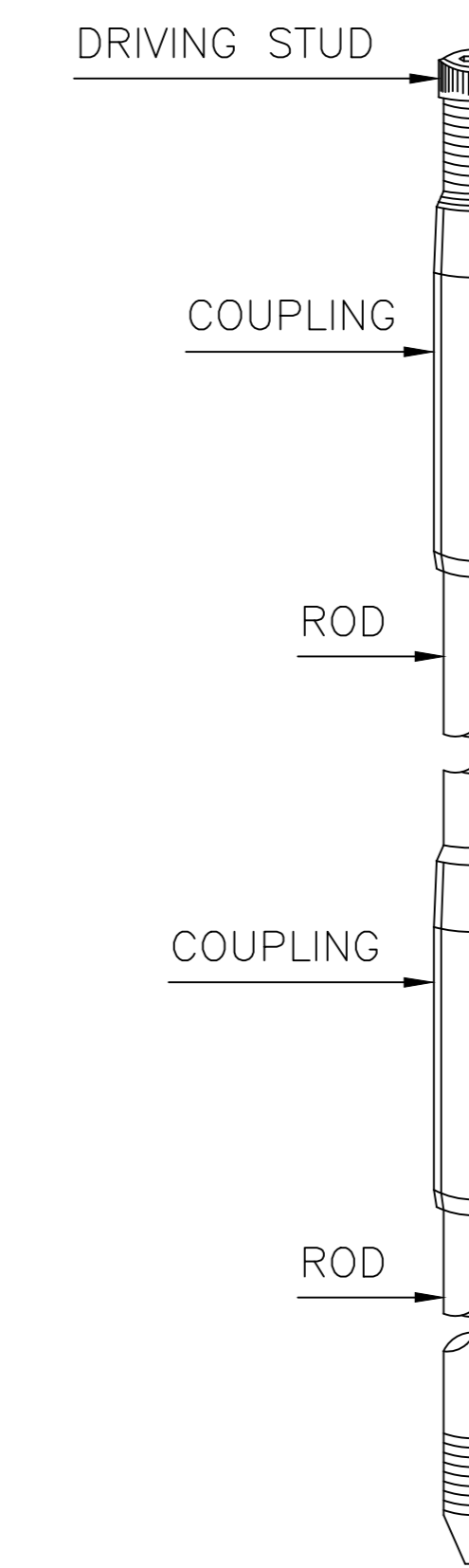
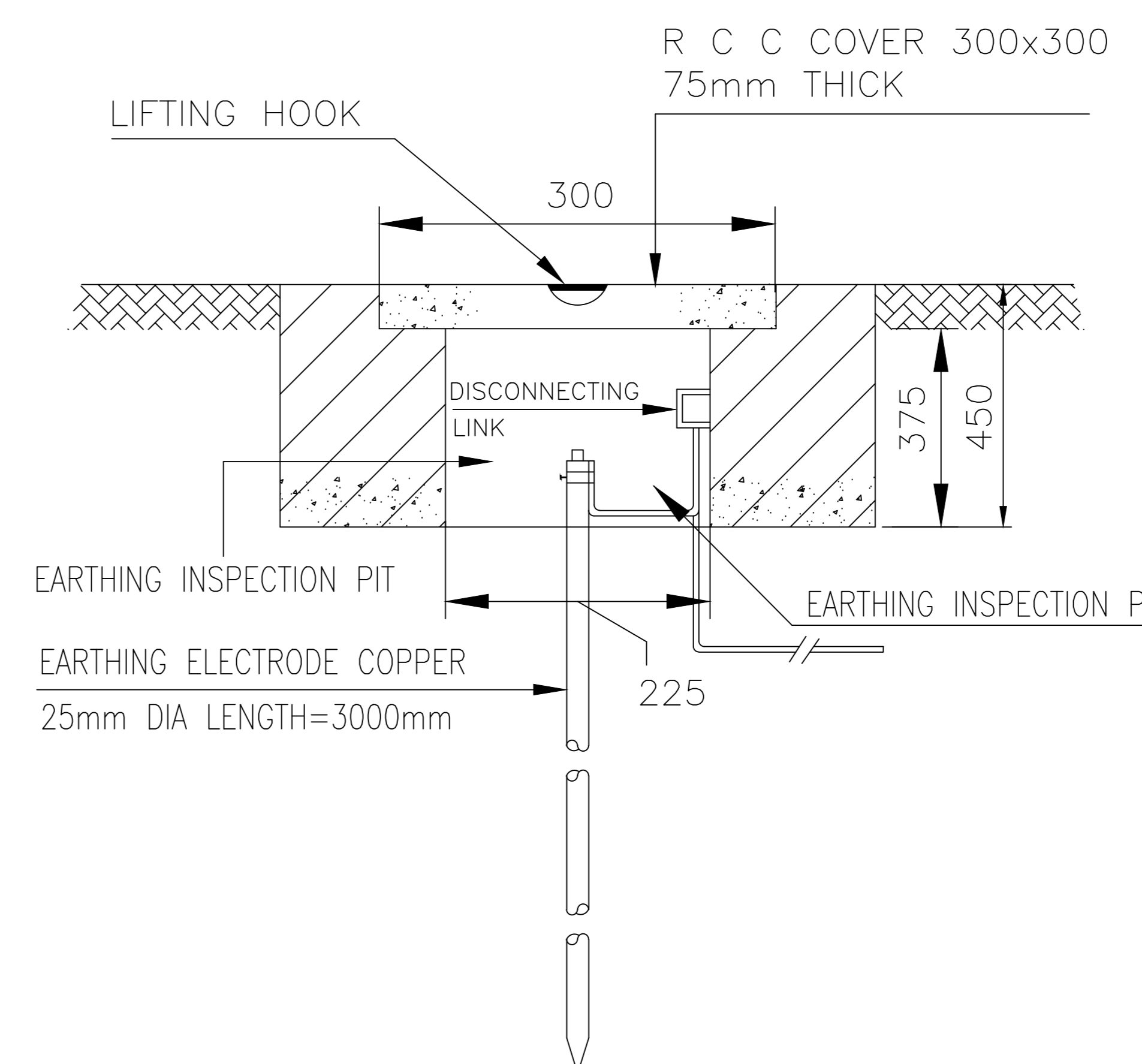
DETAIL OF EARTHING SPIKE



NOTES FOR EARTHING SYSTEM

- 1- EARTH BORE SHALL BE MADE AT 6'-0" AWAY FROM FOUNDATION.
- 2- DISTANCE BETWEEN 2 EARTH BORES SHALL NOT BE LESS THEN 10 ft (3m)
- 3- COPPER CONDUCTOR AT TOP OF G.I PIPE SHALL BE BOLTED WITH THIMBLES, BRASS NUTS, BOLTS ETC.
- 4- JOINTS SHALL BE COVERED WITH BITUMEN
- 5- CONTRACTOR TO MEASURE EARTHING RESISTANCE IN THE PRESENCE OF SITE ENGINEER. BOTH THE SITE ENGINEER AND CONTRACTOR SHALL SIGN THE EARTH TESTING RESULT AND SUBMIT IT TO THE CLIENT FOR RECORD.

DETAIL : B  
EARTHING SYSTEM ROD TYPE



DETAIL OF EARTHING ELECTRODE  
SCALE: N-T-S

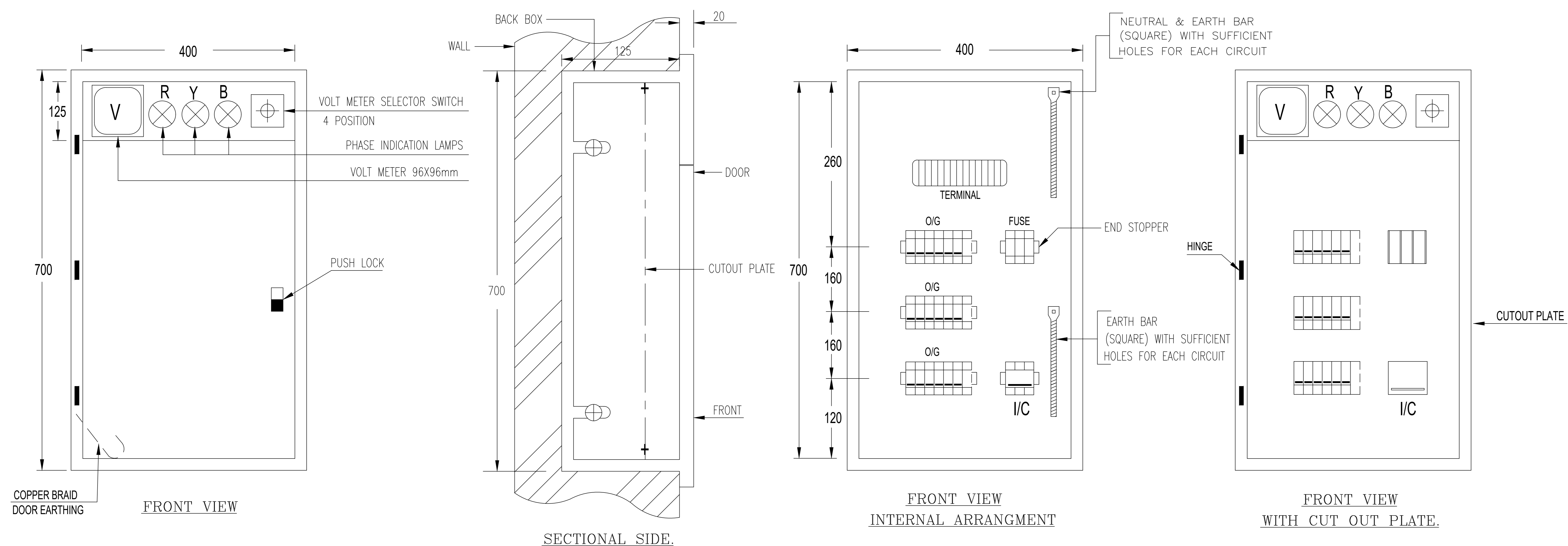
**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: EARTHING DETAILS TYP.	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-09	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

TENTATIVE CONSTRUCTIONAL DETAIL OF:-  
DISTRIBUTION BOARD (DB) RECESSED TYPE.

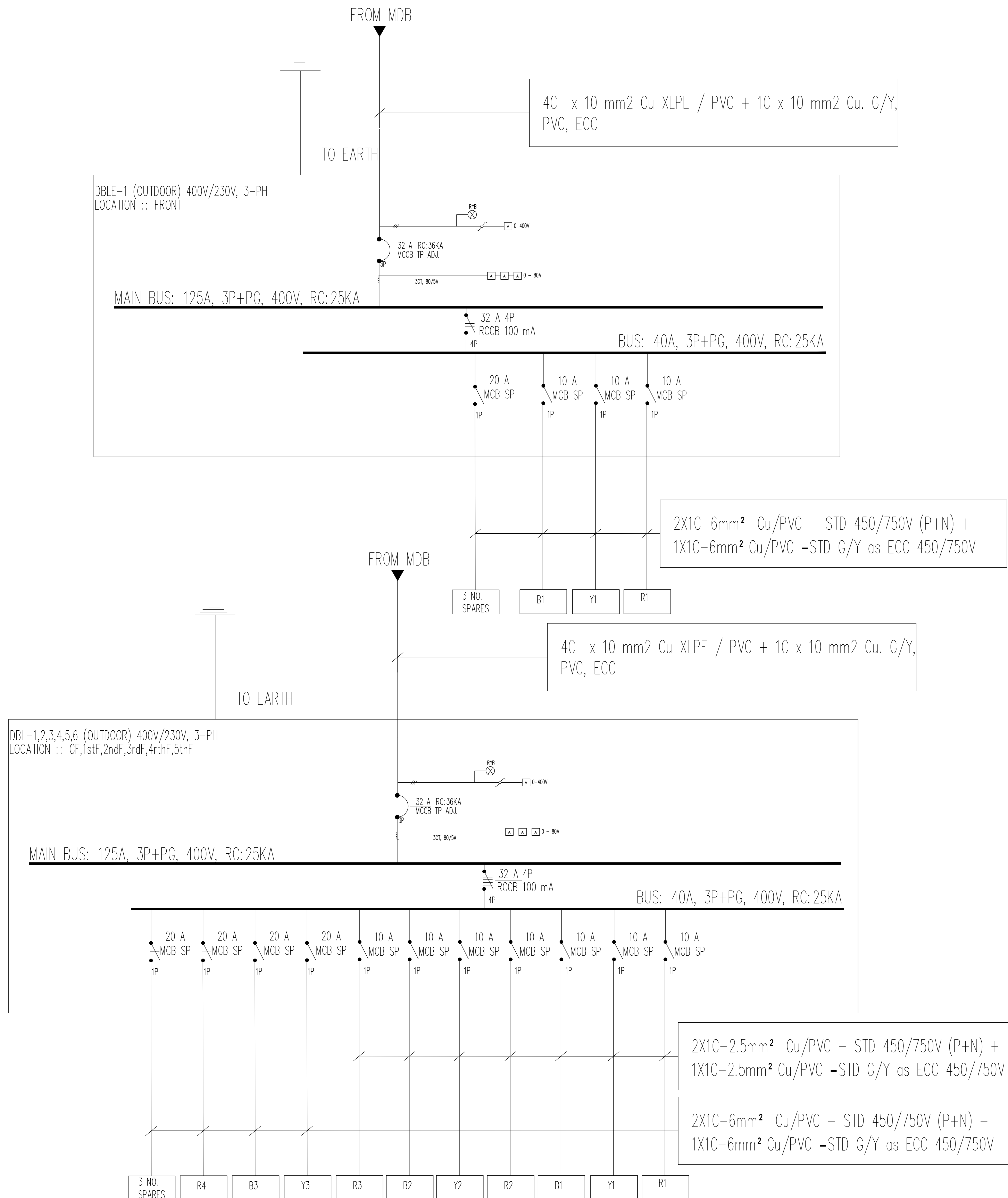


NOTE:-

ACTUAL SHOP DRAWING OF DB'S TO BE SUBMITTED BY CONTRACTOR TO ARCHITECT FOR APPROVAL

**PROJECT**  
DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"

TITLE: DB DETAILS TYP.	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-10	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
<b>BY:</b>	



**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS, ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: SINGLE LINE CIRCUIT DIAGRAMS	
DRAWN BY: SAIM	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: E-11	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

**DESIGNING OF THE PROJECT “FACADE  
UP-GRADATION WORKS INCLUDING CIVIL WORKS),  
ELECTRICAL WORKS, EXTERNAL PAINTING AND  
PROVISION & INSTALLATION OF DIGITAL SIGNAGE,  
REHABILITATION OF COMMON AND WASHROOM  
AREAS ALONG WITH INSTALATION OF LIFT AND  
ALLIED WORKS,  
AT SLB MULTAN”**

**GLASS SHED AND LIFT DRAWINGS**

**CLIENT:**

**STATE LIFE INSURANCE  
CORPORATION OF  
PAKISTAN**

## 1- GENERAL

- 1- ALL DIMENSIONS AND SIZES OF EXISTING STRUCTURAL MEMBERS TO BE OBTAINED FROM EXISTING STRUCTURAL LAYOUT AND ARCHITECTURAL DRAWINGS.
- 2- RETROFITTING DETAILS SHOW ONLY ADDITIONAL SIZES OF STRUCTURAL MEMBERS
- 3- NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL DRAWINGS UNLESS MENTIONED OTHERWISE.
- 4- ALL MATERIALS & WORKMANSHIP SHALL CONFORM TO RELEVANT CODES AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
- 5- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY OF THE STRUCTURES DURING RETROFITTING. HE SHALL ALSO VERIFY ALL DIMENSIONS AND LEVELS BEFORE EXECUTION OF WORK. ANY DISCREPANCY, ERROR OR OMISSION, IF FOUND, SHALL BE BROUGHT TO THE NOTICE OF THE ENGINEER FOR CORRECTION AND APPROVAL.
- 6- THE CONTRACTOR SHALL CO-ORDINATE WITH ARCHITECTURAL DRAWINGS FOR SIZES & LOCATION OF ALL STRUCTURAL MEMBERS
- 7- DO NOT SCALE THE DRAWINGS. DIMENSIONS, GIVEN ON THE DRAWING, SHALL GOVERN.
- 8- ANCHOR BOLTS, EPOXY AND ANY OTHER CHEMICALS USED IN THE WORKS SHALL BE OBTAINED FROM APPROVED MANUFACTURERS WHICH SHALL SUPPLY RELEVANT SPECIFICATIONS ABOUT STRENGTH AND DURABILITY.
- 9- ANY DISCREPANCY FOUND IN THE DRAWINGS SHOULD BE REFERED TO THE ENGINEER.
- 10- ALL EARTH SURFACES AGAINST WHICH CONCRETE IS TO BE POURED SHALL BE CLEAN AND FREE OF ANY DETRIMENTAL IMPURITIES ORGANIC MATTER OR UNSUITABLE MARTIAL.
- 11- ALL EXCAVATED AREA MUST BE PROOF ROLLED BEFORE BUILDING CONCRETE POURING.
- 12- CONCRETING SHOULD NOT BE DONE IN STANDING WATER AND BUILDING CONCRETE MUST BE PLACED ON UNDISTRIBUTED FIRM SOIL.
- 13- INSITU DENSITY OF THE EXCAVATED BED SHOULD BE CONDUCTED, FOR DESIGN IT IS TAKEN AS 0.75 TON/SFT IF FOUND LESS DURING TESTING 2 FEETS OF ENGINEERING FILL (50% SAND+50%STONE BALLAST) SHALL BE USED AND ENSURED BY THE CLIENT.
- 14- FOUNDATION SHOULD BE BACK FILLED BY APPROVED MATERIAL COMPACTED IN LAYERS OF 150mm IN COMPACTED THICKNESS UPTO 95% MODIFIED AASHTO DENSITY.
- 15- WHERE ADJACENT FOUNDATIONS ARE AT DIFFERENT FORMATION ELEVATIONS, BLINDING CONCRETE FILL SHALL BE PLACED UNDER THE HIGHER FOUNDATION TO THE DEPTH OF THE LOWER FOUNDATION AS DIRECTED AND APPROVED BY THE ENGINEER.

## 2- REINFORCED CONCRETE

- 1- STRUCTURAL DESIGN IS BASED ON THE AMERICAN CONCRETE INSTITUTE CODE OF REINFORCED CONCRETE ACI 318-2008, IBC-2009 & UBC-97 BUILDING CODES.
- 2- ALL REINFORCED CONCRETE MATERIAL SHOULD CONFIRM TO THE FOLLOWING UNLESS OTHERWISE NOTED ON THE DRAWINGS.
  - i- CEMENT SHALL CONFIRM TO ASTM C-150 TYPE-1 (ORDINARY PORTLAND CEMENT).
  - ii- AGGREGATE SHALL CONFIRM TO THE STANDARD SPECIFICATIONS FOR CONCRETE AGGREGATE ASTM C-33.
  - iii- WATER SHALL BE FREE FROM OIL OR OTHER MATERIALS THAT CAN ADVERSELY AFFECT CONCRETE STRENGTH OR DURABILITY.
- 3- ALL CONCRETE SURFACES IN CONTACT WITH SOIL SHALL BE BITUMEN COATED (2 COATS).
- 4- ALL CORNERS/EDGES OF CONCRETE COLUMNS OR EXPOSED SURFACES SHOULD BE CHAMFERED TO 20mm IF SPECIFIED ON DRAWINGS.
- 5- ALL CONCRETE EXPOSED SURFACES SHALL HAVE FAIR FACE FINISH ALL CONCRETE SURFACES BURIED INTO GROUND HAVE ORDINARY FINISH.
- 6- THE MINIMUM COMPRESSIVE CYLINDER STRENGTH OF BLINDING CONCRETE(P.C.C 1:4:8) SHALL BE 10 MPa (1500 PSI) AT 28 DAYS.
- 7- REINFORCED CONCRETE SHALL HAVE THE FOLLOWING 28 DAYS COMPRESSIVE CYLINDER STRENGTH AND SHALL CONFIRM TO BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE ACI- 318-08. (CYLINDER STRENGTH GIVEN IN TABLE)

STRUCTURAL MEMBER	MIN. STRENGTH		MIX RATIO
	PSI	MPa	
FOUNDATIONS	3,000	20	1: 2: 4
FOUNDATION BEAMS	4,000	28	1: 1.5: 3
COLUMNS	3,000	20	1: 2: 4
WALLS	3,000	20	1: 2: 4
BEAMS	3,000	20	1: 2: 4
SLABS	3,000	20	1: 2: 4
WATER TANKS	4,000	28	1: 1.5: 3

- 8- CONCRETE TRIAL MIXES SHOULD BE CARRIED OUT TO ACHIEVE WATER/CEMENT RATIO & STRENGTH.
- 9- MUST ADD SUPERPLASTISIZER IN CONCRETE MIX TO ACHIEVE DESIRED STRENGTH OF CONCRETE.

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**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN”**

TITLE: CIVIL GENERAL NOTES	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: GN-01	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
<b>CLIENT:</b>	<b>STATE LIFE INSURANCE CORPORATION OF PAKISTAN</b>
<b>BY:</b>	

## GENERAL NOTES

### GENERAL DESIGN PARAMETERS

- WIND SPEED= 90 mph
- EXPOSURE CAT. = B
- ENCLOSURE CAT. = AS PER BUILDING
- RAINFALL INTENSITY = 150 mm/hr

### DESIGN CODES

- HOT ROLLED DESIGN AS PER (AISC LRFD 93)
- APPLIED LOAD ARE AS PER (MBMA 2006)
- COLD FORMED DESIGN PER (AISI-2001)

## STRUCTURAL HOT ROLLED STEEL SPECIFICATION

- ALL STRUCTURAL STEEL SECTIONS, SHALL CONFORM TO ASTM A36 SPECIFICATION WITH FY=36 KSI & FU =50 KSI
- ALL CONNECTIONS SHALL CONFORM TO RELEVANT REQUIREMENTS OF AISC AND AWS.
- ALL WELDS SHALL BE FILLET WELDS, MADE WITH BE E 70XX ELECTRODESS.
- ALL OTHERS BOLTS SHALL CONFORM TO ASTM A 325 SPECIFICATION
- ALL FLANGES TO WEB FILLET WELDS SHALL BE CONTINUOUS ON ONE SIDE OF WEB. WELDS SHALL BE AS PER DESIGN.
- FABRICATION AND WELDING MUST ADHERE TO GOOD ENGINEERING PRACTICES AND THE RELEVANT CODES, WITH PROPER QUALITY CONTROL.

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TITLE: STEEL GENERAL NOTES

DRAWN BY: ABDULLAH

CHECKED BY: ARCH. SHERAZ

COVERED AREA:

DRAWING NO:  
GN-02

REV.  
NO:

DATE:  
10-01-2026

ISSUED  
FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**

1. GENERAL

1.1 STANDARDS OF HOLE SIZE AND DIAMETER OF BOLT

(UNIT : mm.)

BOLT DIAMETER (d)	HOLE DIAMETER (D)		
	FOR HIGH - STRENGTH BOLT	FOR NORMAL BOLT	FOR ANCHOR BOLT
d < 20	d + 1.0	d + 0.5	d + 5.0
d ≥ 20	d + 1.5		

1.2 ALL STRUCTURAL STEEL SHALL CONFORM TO ASTM-A36, UNLESS OTHERWISE NOTED  
LIGHT GAUGE STEEL SHALL CONFORM TO FE. 24 TIS. UNLESS OTHERWISE NOTED.

1.3 WELDING ELECTRODE WITH TENSILE STRENGTH OF 485 N/mm. SHALL BE USED.

1.4 ALL STRUCTURAL STEEL SHALL BE SAND-BLASTED AND PAINTED AS SPECIFIED.

1.5 STANDARDS OF THROUGH-HOLE OF REBAR

(UNIT : mm.)

NOMINAL SIZE OF REBAR	HOOP BAR, CROSS BAR, ETC.			MAIN BAR			
	DB 10	DB 12	DB 16	DB 20	DB 22	DB 25	DB 28
HOLE DIAMETER	17 φ	17 φ	21.5 φ	35 φ	40 φ	40 φ	45 φ

NOTE:

\* THROUGH-HOLE FOR EQUIPMENT PIPING SHALL BE PROCESSED IN ACCORDANCE WITH HOLE DIAMETER IN THE DESIGN DRAWING OR SHOP DRAWING.

1.3 THE SPECIFICATION OF LEVELING MORTAR UNDER THE BASE SHALL BE AS FOLLOW :

\* NONSHRINK MORTAR [ STRENGTH : 350 kg/cm<sup>2</sup> , THICKNESS : 30 mm.]

NOTE:

\* THE STRENGTH OF MORTAR SHALL BE STRONGER THAN THE STRENGTH OF CONCRETE FOR FOUNDATION, ETC.

\* COATING THICKNESS SHALL BE 30-50 mm.

\* IN PRINCIPLE, NONSHRINK MORTAR SHALL BE USED AS GROUT.

WELDING SYMBOL

- SHOP WELDING
- FIELD WELDING
- WELDING ALL-AROUND
- BUTT WELDING
- FILLET WELDING (ONE SIDE)
- FILLET WELDING (BOTH SIDE)
- FLARE WELDING (BAR TO PL)
- FLARE WELDING (BAR TO BAR)

2. WELDING

NOTE:

UNLESS OTHERWISE SHOWN ON DETAILED DRAWING, THE FOLLOWING WELDING METHOD SHALL BE USED.

2.1 BUTT WELDING

(UNIT : mm.)

(A) "T" SHAPE (BACKING STRIP)	(B) "T" SHAPE (GAUGING)	(C) "T" SHAPE (K-GROOVE)
(D) "-" SHAPE (SAME PL THK.)	(E) "-" SHAPE (DIFFERENT PL THK.-1)	(F) "-" SHAPE (DIFFERENT PL THK.-2)
(G) "-" SHAPE (GAUGING)	(H) BASE PL AND COLUMN FLANGE	(I) "L" SHAPE

2.2 FILLET WELDING

(J) "T" SHAPE	(K) "T" SHAPE (K-TYPE)	(L) FLARE WELDS OF RE-BARS

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**AND ALLIED WORKS,**  
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TITLE: STEEL GENERAL NOTES

DRAWN BY: ABDULLAH

CHECKED BY: ARCH. SHERAZ

COVERED AREA:

DRAWING NO:  
GN-03

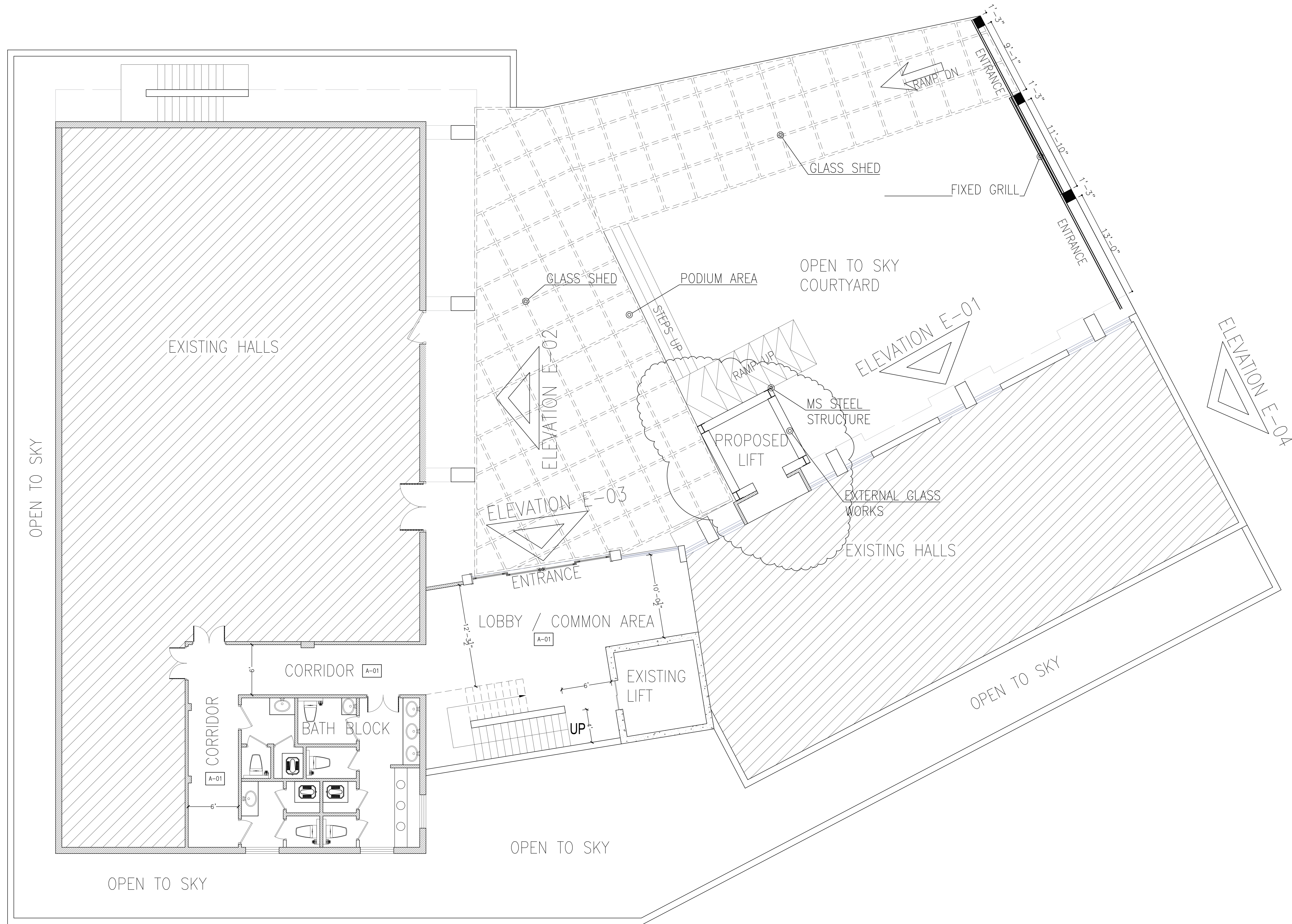
REV.  
NO:

DATE:  
10-01-2026

ISSUED  
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CLIENT: STATE LIFE INSURANCE CORPORATION OF PAKISTAN

BY:



**PROJECT**  
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**COMMON AND**  
**WASHROOM AREAS**  
**ALONG WITH**  
**INSTALLATION OF LIFT**  
**AND ALLIED WORKS,**  
**AT SLB MULTAN”**

TITLE: MASTER PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: G-01	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
CLIENT:	STATE LIFE INSURANCE CORPORATION OF PAKISTAN
BY:	

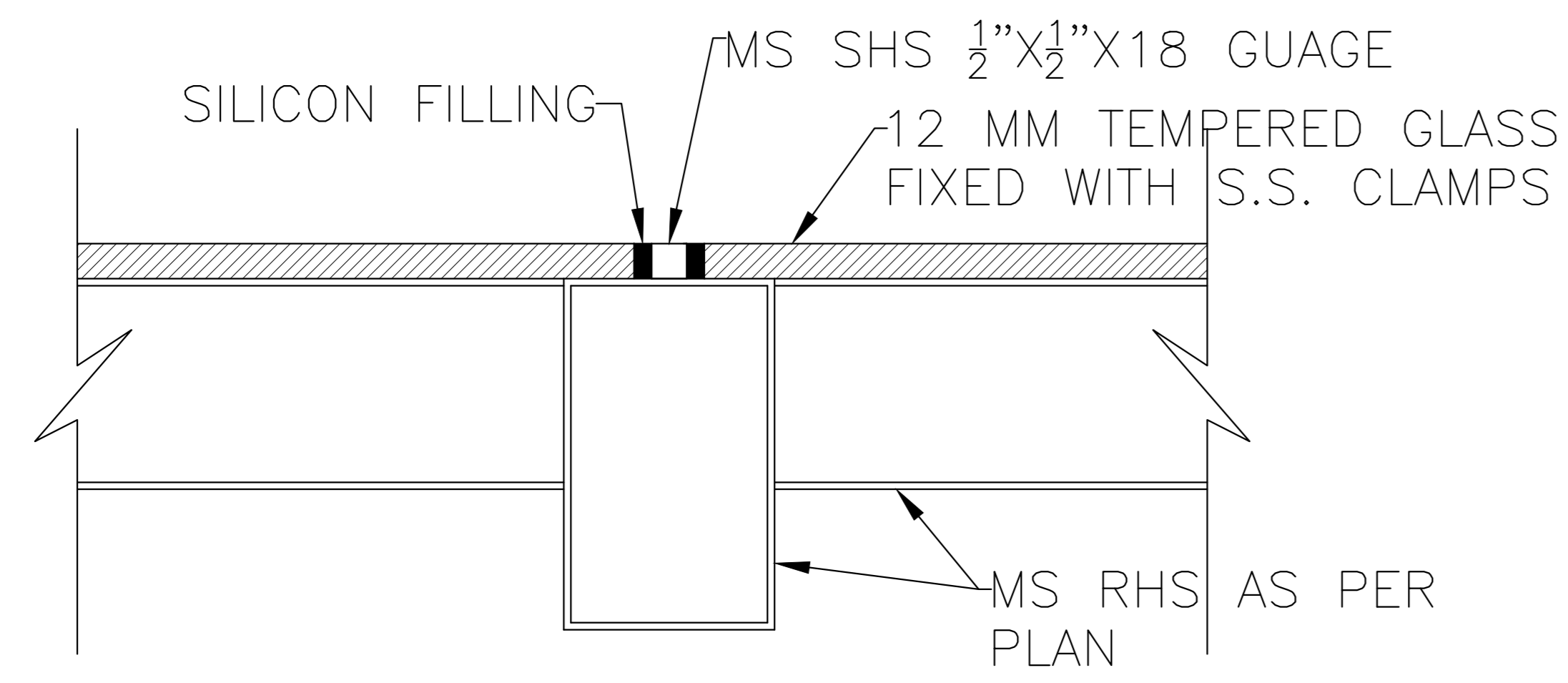
# GROUND FLOOR PLAN



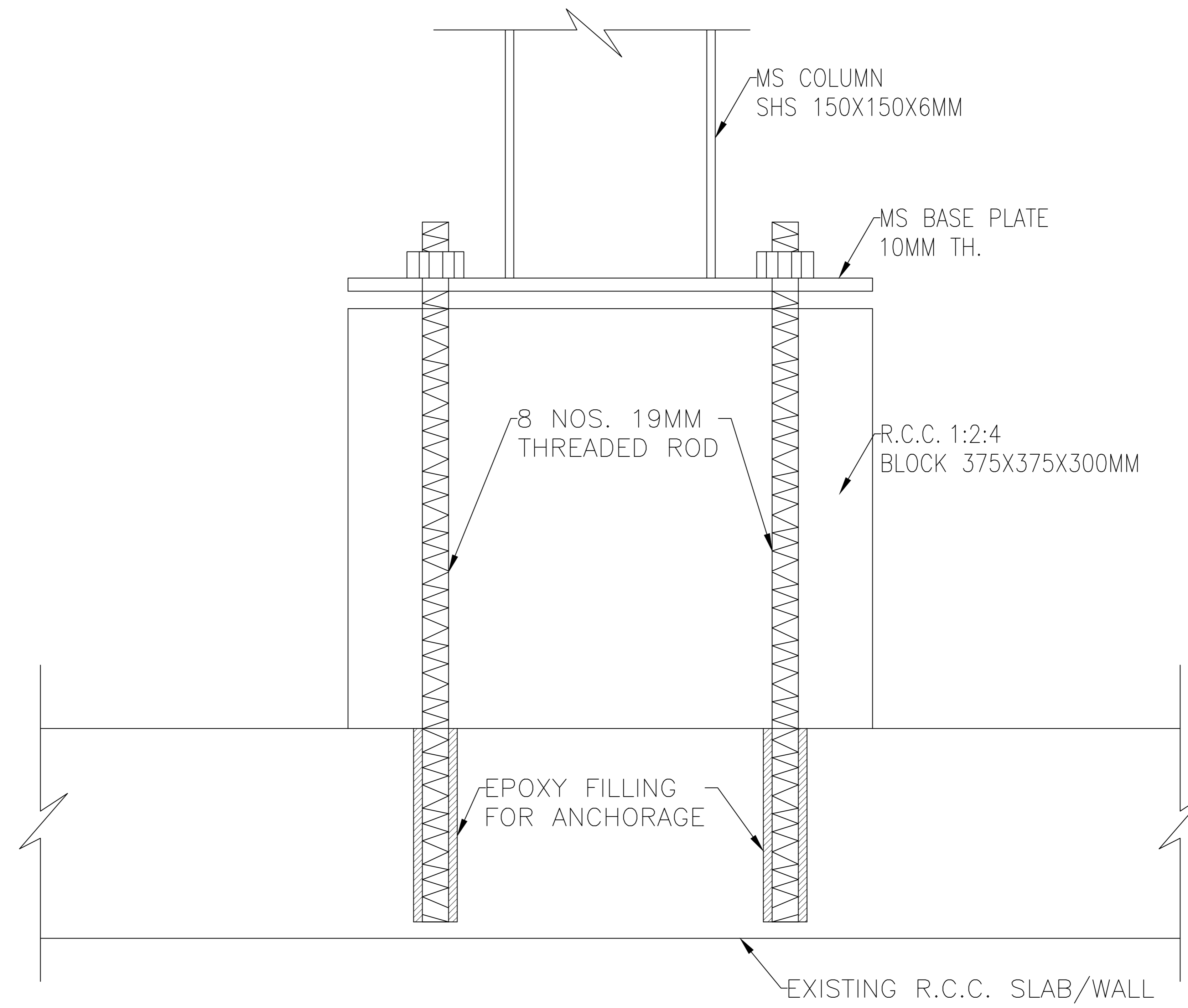
**GLASS SHED FRAMING PLAN**

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: GLASS SHED FRAMING PLAN	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: G-02	REV. NO:
DATE: 10-01-2026	ISSUED FOR:
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<b>BY:</b>	



**DETAILS-S 1**



**GLASS SHED COLUMNS  
ANCHORAGE DETAILS**

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**INSTALLATION OF LIFT**  
**AND ALLIED WORKS,**  
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TITLE: GLASS SHED JOINTING AND BASE  
FIXING DETAILS

DRAWN BY: ABDULLAH

CHECKED BY: ARCH. SHERAZ

COVERED AREA:

DRAWING NO: G-03

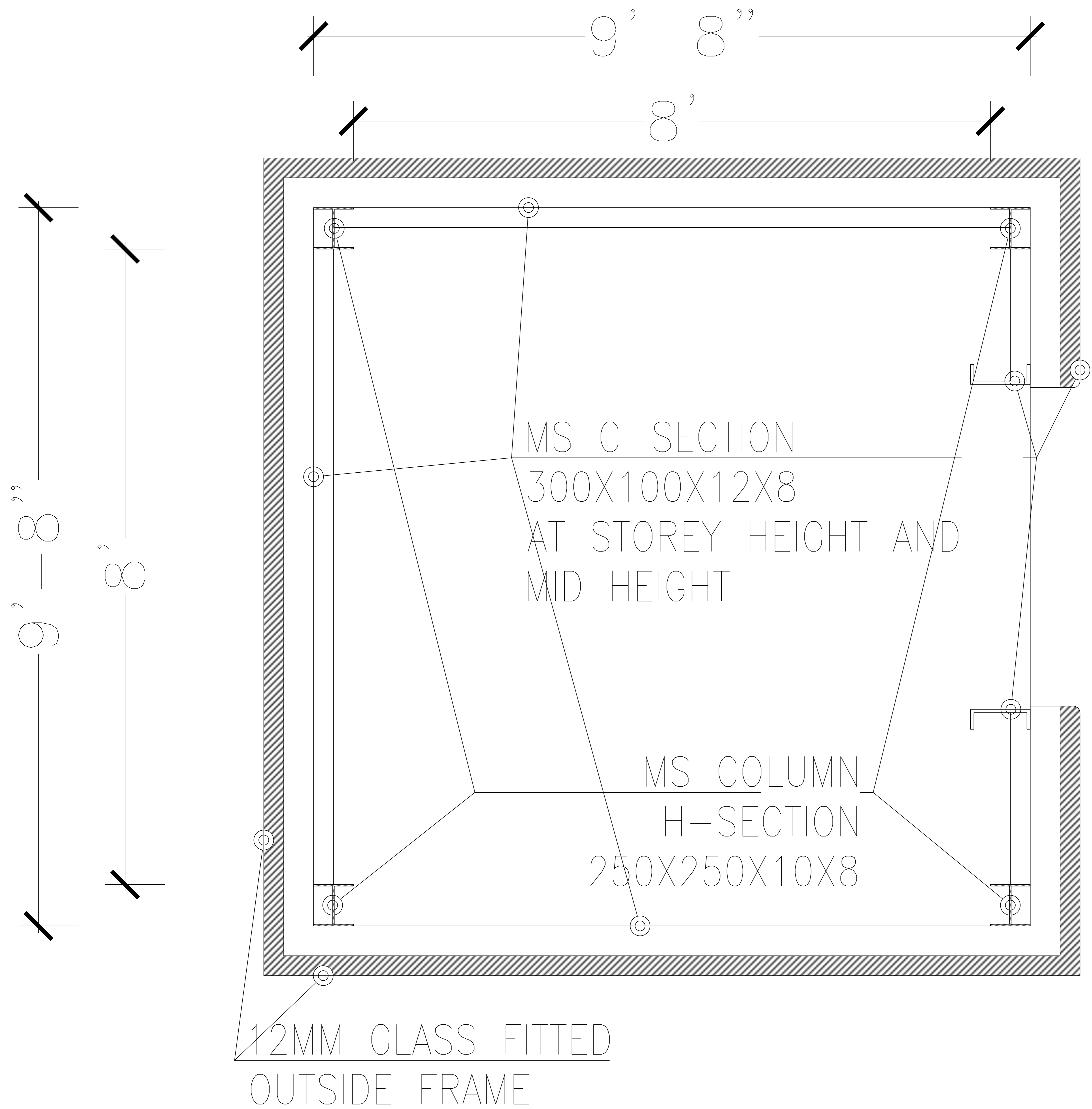
REV. NO:

DATE: 10-01-2026

ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE  
CORPORATION OF  
PAKISTAN

**BY:**



LIFT PLAN DETAILS

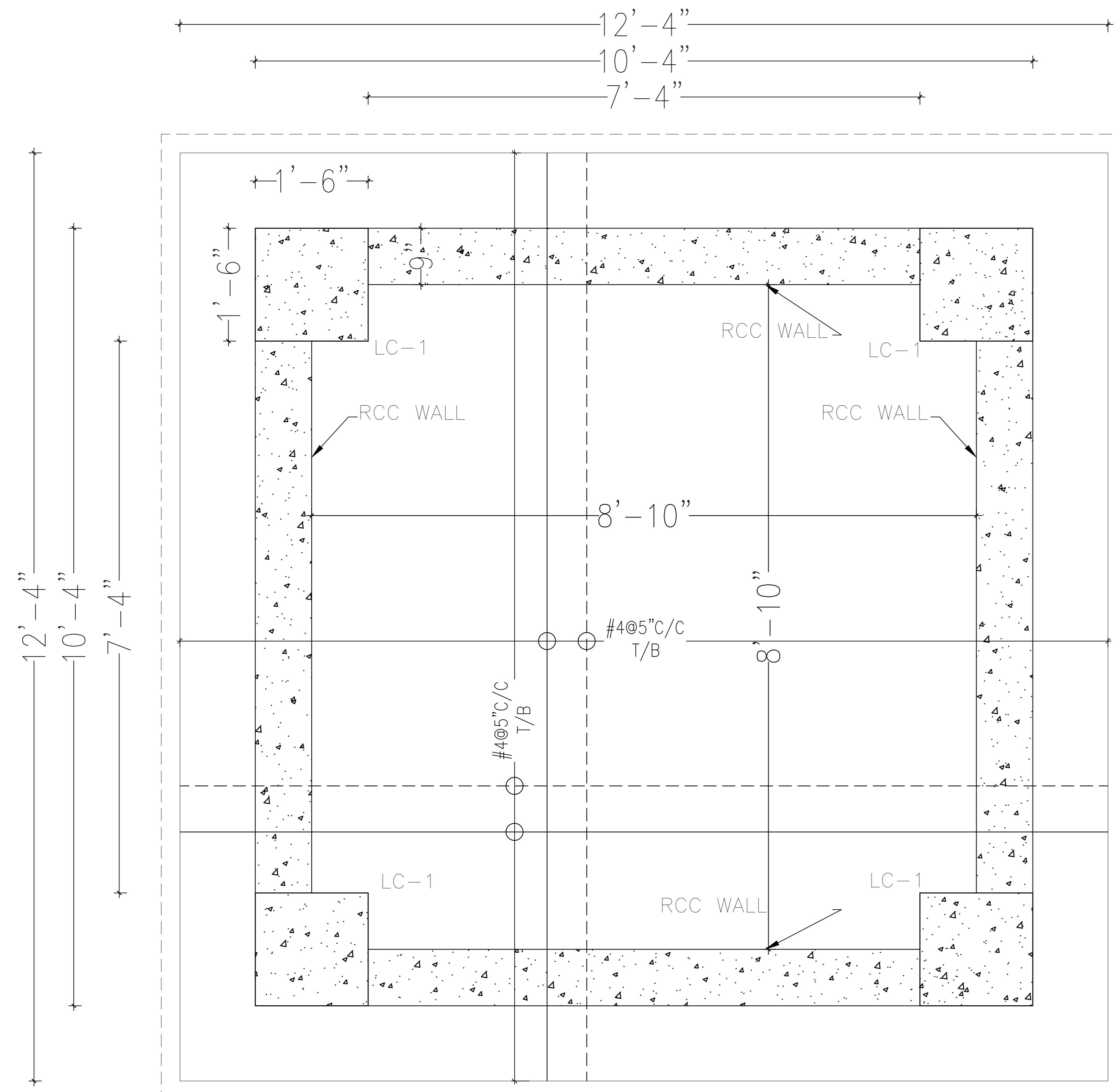
**PROJECT**  
**DESIGNING OF THE**  
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**AT SLB MULTAN"**

TITLE: LIFT PLAN DETAILS	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: L-01	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

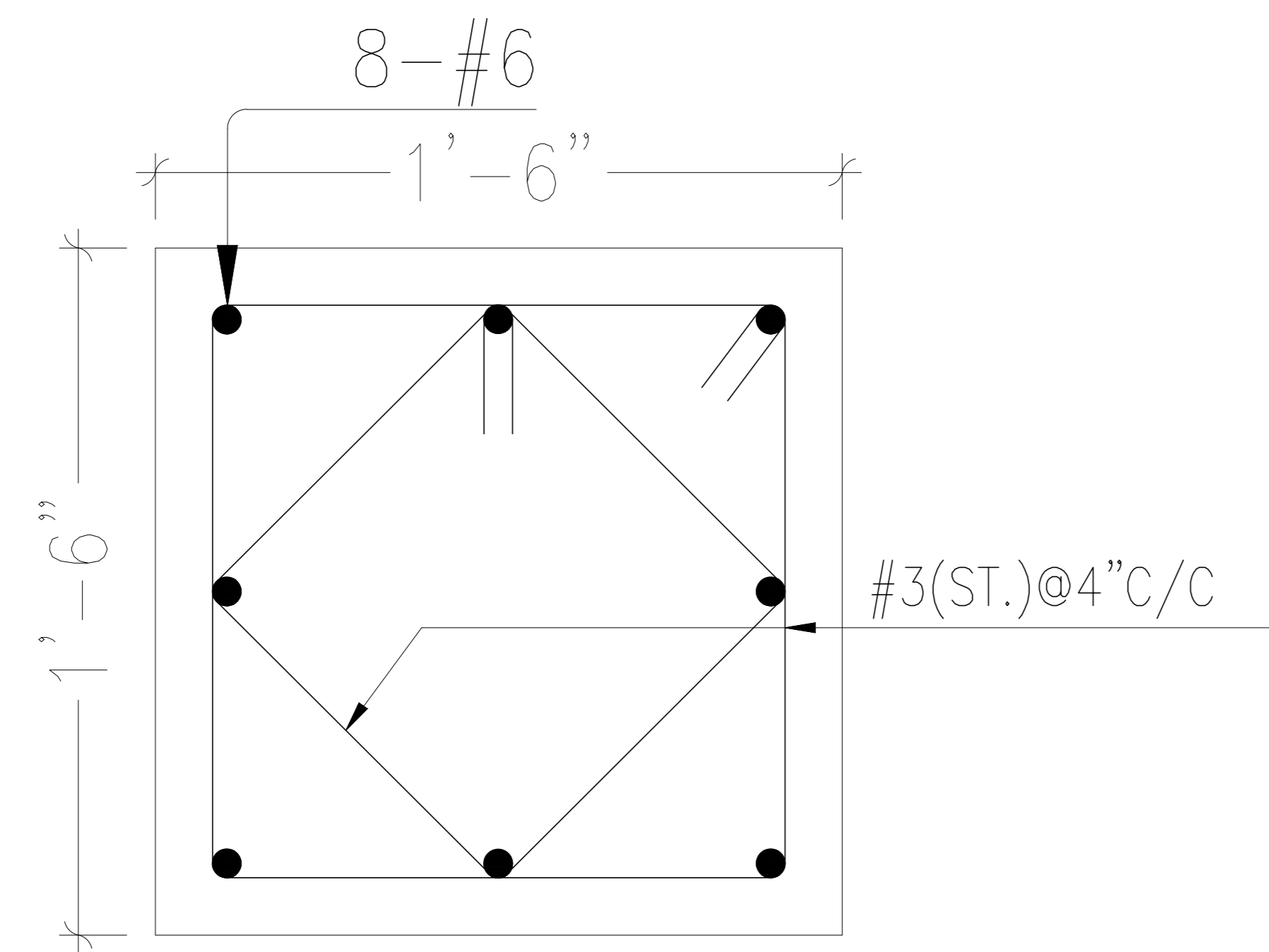
**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

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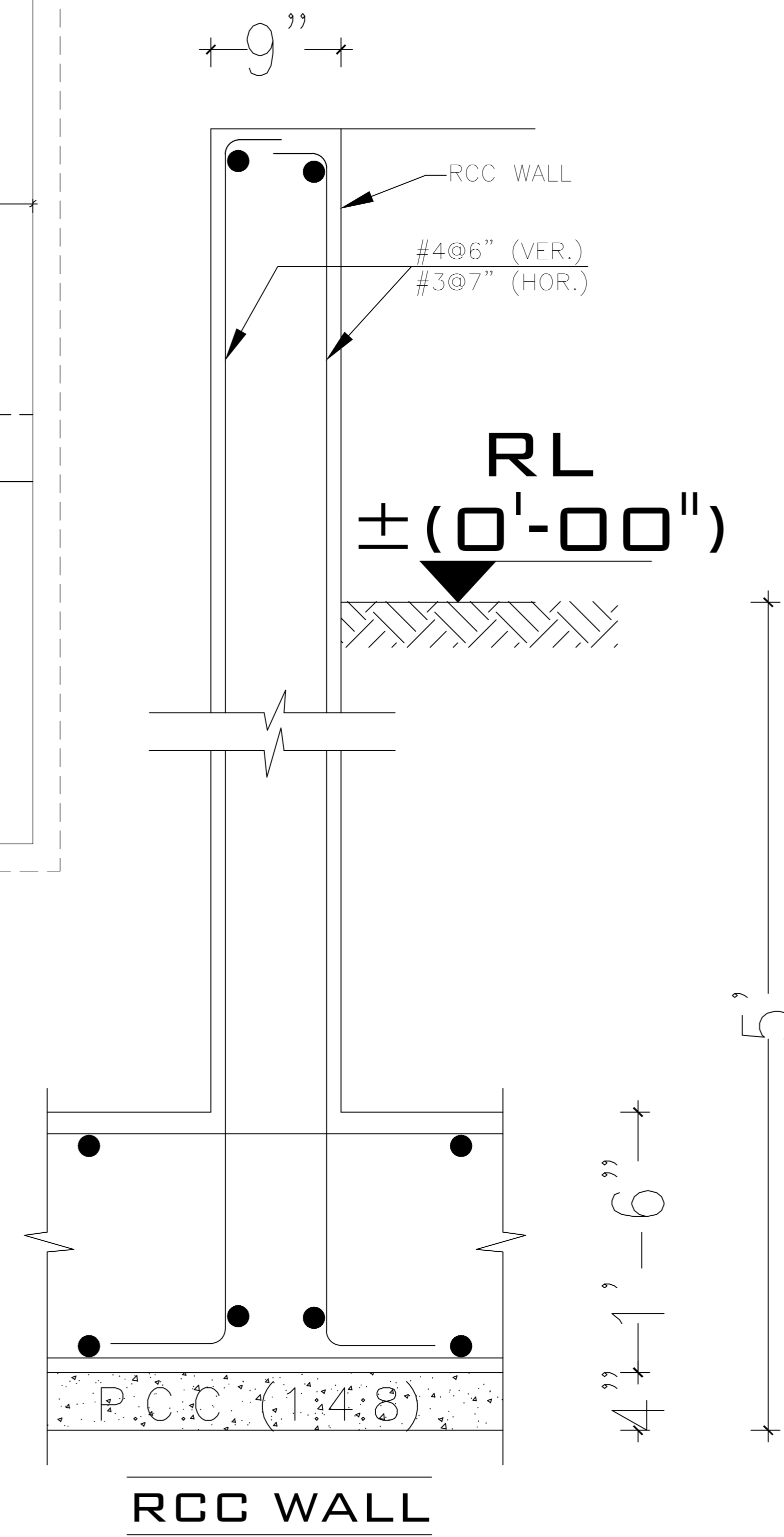




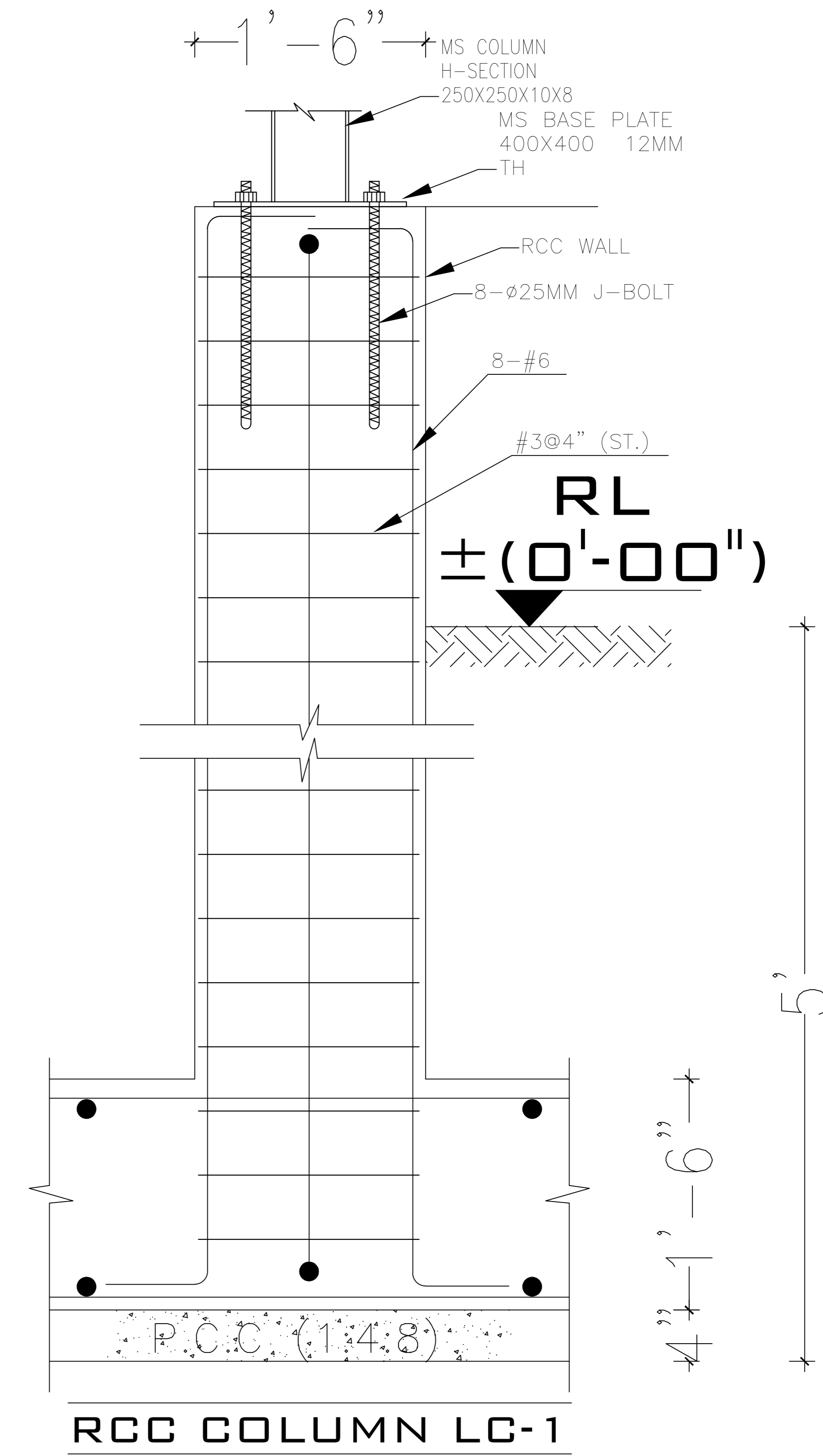
LIFT FOUNDATION PLAN (18" TH.)



LC-1



RCC WALL



RCC COLUMN LC-1

**PROJECT**  
**DESIGNING OF THE PROJECT "FACADE UP-GRADATION WORKS INCLUDING CIVIL WORKS), ELECTRICAL WORKS, EXTERNAL PAINTING AND PROVISION & INSTALLATION OF DIGITAL SIGNAGE, REHABILITATION OF COMMON AND WASHROOM AREAS ALONG WITH INSTALATION OF LIFT AND ALLIED WORKS, AT SLB MULTAN"**

TITLE: LIFT COLUMN BASE FIXING DETAILS	
DRAWN BY: ABDULLAH	
CHECKED BY: ARCH. SHERAZ	
COVERED AREA:	
DRAWING NO: L-03	REV. NO:
DATE: 10-01-2026	ISSUED FOR:

**CLIENT:** STATE LIFE INSURANCE CORPORATION OF PAKISTAN

**BY:**