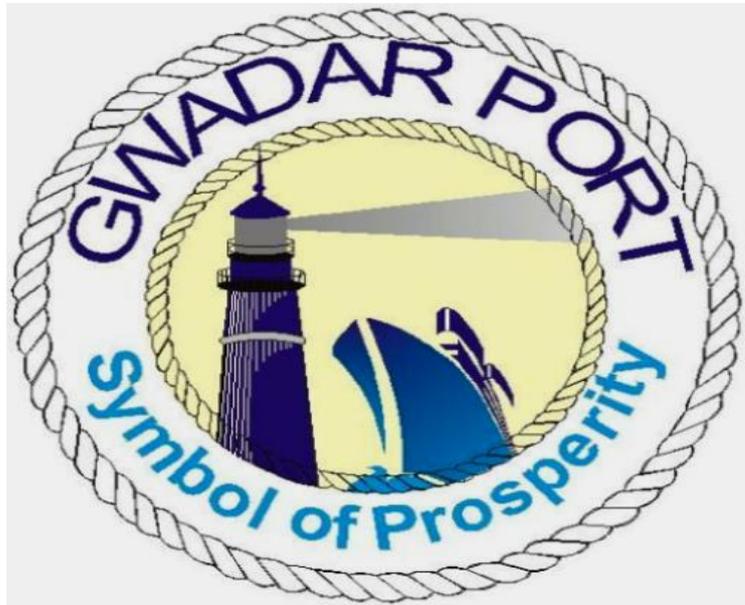


**BIDDING DOCUMENTS  
FOR  
(INFRASTRUCTURE WORK OF OFF-DOCK  
TERMINAL AT GWADAR)**

**(Single Stage Two Envelop Procedure)**



**Gwadar Port Authority  
Head Office Pak-China Friendship Avenue  
Gwadar**

## PREFACE

Public Procurement is carried out in Pakistan in accordance with the provisions laid down in Public Procurement Regulatory Framework consisted of Public Procurement Ordinance- 2002; Public Procurement Rules-2004 and allied Regulations, Regulatory Guides and Guidelines.

National Standard Bidding/Procurement Documents are developed for standardizing the procurement procedures and practices in the procuring agencies of the Federation of Pakistan and has the status of the Regulations in terms of section 27 of the PPRA Ordinance read with Rule-23(4) of Public Procurement Rules.

The document consists of general as well as specific provisions to be applicable for the procurement of works and can be used with or without pre-qualification process. The specific provisions supplement to the general provisions and may be amended or opted by the procuring agencies in the manner and to the extent prescribed in the respective sections.

This document is a live document, and may be updated on 30<sup>th</sup> June of each financial year (as and when required) considering the regulatory experience feedback based on monitoring the procurement practices and valuable suggestions of the stakeholders (i.e. procuring agencies, vendors and general public).



# 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. *(This Section contains provisions that are to be used without modifications.)*

#### **Section III- Bid Data Sheet (BDS)**

This Section includes provisions specific to procurement and to supplement Section-II, Instructions to Bidders. *(This section may be customized where option is available, in accordance with the requirements of the Procuring agency/Employer).*

#### **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. *(To be filled by the Procuring agency/Employer).*

#### **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. *(This Section contains provisions that are to be used without modifications).*

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

This Section consists of Contract Data and Specific Provisions which contains clauses specific to this contract. *(This section may be customized where option is available, in accordance with the requirements of the Procuring agency/Employer).*



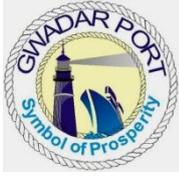
**Section X - Contract Forms**

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**



# Gwadar Port Authority

Pak-China Friendship Avenue, Gwadar  
Office No. 0864-212301



## INVITATION TO e-BIDS

Gwadar Port Authority, Ministry of Maritime Affairs, Government of Pakistan invites electronic bids as per PPRA rule 36(b) from well reputed firms having National tax No, BRA & licensed by PEC in category C-3 for the execution of following project works:

S#	Title of Work/Project	Bid Security	Bid Submission Last Date/Time	Bid Opening Date/Time
1.	Infrastructure work of Off-Dock Terminal at Gwadar	2% of Bid Price	07-11- 2025 11:00 AM	07-11- 2025 11:30 AM

Bids to be submitted as per conditions set out in bidding documents available on Public Procurement Regulatory Authority (PPRA) E-PADS system <http://eprocure.gov.pk>. Bids to be submitted electronically through PPRA e-PADS website portal <http://eprocure.gov.pk>. before closing time & date. Bids must be submitted electronically through EPADS and manual submission of bids shall not be considered.

The bid security in shape of Bank instrument in favour of Gwadar Port Authority must be attached through EPADS online submission. Pre Bid meeting will be conducted on 30<sup>th</sup> October, 2025 at 11.00 AM at GPA Head Office Gwadar.

This advertisement is also available on Gwadar Port Authority website [gwadarport.gov.pk](http://gwadarport.gov.pk).

Gwadar Port Authority reserves the right to accept or reject any or all bids in the light of Public Procurement Regulatory Authority (PPRA) Rules.

  
**PROJECT DIRECTOR**  
**(Infrastructure work of Off-Dock Terminal**  
Gwadar Port Authority,  
Pak-China Friendship Avenue, Gwadar  
Office No. 0864-212301

## **SECTION II: INSTRUCTION TO BIDDERS (ITBs)**

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

**A. INTRODUCTION**

<p><b>1. Scope of Bid</b></p>	<p>1.1</p>	<p>The Procuring agency/Employer (PA), as indicated in the <b>Bid Data Sheet</b> (BDS) invites Bids for the execution of Works as specified in the BDS and <b>Section V- Works Requirements</b>. The name, identification, and number of lots (contracts) of this National/ International Competitive Bidding process are specified in the BDS.</p>
<p><b>2. Source of Funds</b></p>	<p>2.1</p>	<p>Source of funds as referred in Bid Data Sheet.</p>
<p><b>3. Eligible Bidders</b></p>	<p>3.1</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> <p><i>(The limit on the number of members of JV or Consortium may be prescribed in BDS, in accordance with the guidelines issued by the PPRA).</i></p>
	<p>3.2</p>	<p>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</p>
	<p>3.3</p>	<p>Verifiable copy of the agreement that forms a joint venture or consortium shall be required to be submitted as part of the Bid.</p>
	<p>3.4</p>	<p>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.</p>
	<p>3.5</p>	<p>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.</p>



	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 or were provided by any affiliate that directly or indirectly controls, is controlled by, or is under common control with that firm;</li> <li>d) have controlling shareholders in common; or</li> <li>e) receive or have received any direct or indirect subsidy from any of them; or</li> <li>f) have the same legal representative for purposes of this Bid; or</li> <li>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</li> <li>h) Submit more than one bid in this bidding process.</li> </ul>
	3.8	<p>A Bidder may be ineligible if –</p> <ul style="list-style-type: none"> <li>(a) he is declared bankrupt or, in the case of company or firm, insolvent;</li> <li>(b) payments in favor of the bidder is suspended in accordance with the judgment of a court of law other than a judgment</li> </ul>



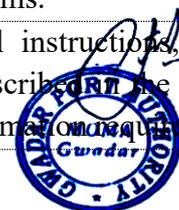
		<p>declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;</p> <p>(c) legal proceedings are instituted against such bidder involving an order suspending payments and which may result, in accordance 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 Statuary 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	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 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

<b>7. Contents of Bidding Documents</b>	7.1	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: <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 & 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
	7.2	The number of copies to be completed and submitted with the Bid is specified in the <b>BDS</b> .
	7.3	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.
	7.4	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



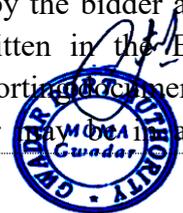
		bidding documents will be at the bidder's risk and may result in the rejection of his bid.
<b>8. Clarification of Bidding Document, Pre-bid Meeting</b>	8.1	A prospective bidder requiring any clarification of the bidding document may notify the Procuring agency/Employer in writing or in electronic form that provides record of the contents of communication at the Procuring agency/Employer's address indicated in the <b>BDS</b> .
	8.2	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) 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	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. 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.
	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**

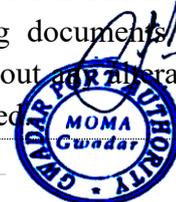
<b>10. Language of Bid</b>	10.1	The bid prepared by the bidder, as well as all correspondence and documents relating to the bid exchanged by the bidder and the Procuring agency/Employer shall be written in the English language unless specified in the BDS. Supporting documents and printed literature furnished by the bidder <del>shall be written in another</del>
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		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.
<b>11. Documents Establishing Eligibility of Material, Equipment and Works, their Conformity to Bidding Documents</b>	11.1	<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>
	11.2	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.
	11.3	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.
	11.4	<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</li> </ul>



		<p>demonstrating substantial responsiveness of the material, equipment and works to those specifications, or a 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 alterations to its format and no substitute shall be accepted.



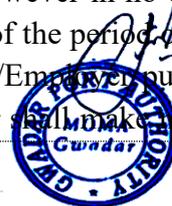
<b>15. Bid Prices</b>	15.1	The bid prices quoted by the bidder in the Standard bid Forms, Bill of Quantities and in the Price Schedules shall conform to the requirements specified below or exclusively mentioned hereafter in the bidding documents.
	15.2	The bidder shall fill in rates and prices for all 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	<p>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):</p> <p>Provided that:</p> <ul style="list-style-type: none"> <li>a) where there is only one (substantially) responsive bidder, or</li> <li>b) where there is provision for alternate proposals and the respective items are not listed in the other bids,</li> </ul> <p>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.</p>
	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.



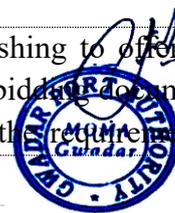
<b>16. Currencies of Bid and Payment</b>	16.1	The currency(ies) of the bid and the currency(ies) of payments shall be as specified in the <b>BDS</b> .
	16.2	For the purposes of comparison of bids quoted in different currencies, the price shall be converted into a single currency specified in the bidding 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	Bids shall remain valid for the period specified in the <b>BDS</b> after the bid submission deadline prescribed by the Procuring agency/Employer. A bid valid for a shorter period shall be rejected by the Procuring agency/Employer as non-responsive. The period of bid validity will be determined from the complementary bid securing instrument i.e. the expiry period of bid security or bid securing declaration as the case may be.
	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 Bid Securing Declaration</b>	19.1	Pursuant to <b>ITB 11.1</b> unless otherwise specified in the <b>BDS</b> , the bidder shall furnish as part of its bid, a Bid Security in form of



		<p>fixed amount not exceeding five percent of the estimated value of procurement determined by the Procuring agency/Employer and in the amount and currency specified in the <b>BDS</b> or Bid Securing Declaration as specified in the <b>BDS</b> in the format provided in <b>Section VI (Standard Bidding Forms)</b>.</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	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> .
	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> <p>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;</p> <p>b) A cashier's or certified cheque; or</p> <p>c) Another security as indicated in the <b>BDS</b>.</p>
	19.4	The Bid Security or Bid Securing Declaration shall be in accordance with the Form of the Bid Security or Bid Securing Declaration included in <b>Section VI (Standard Bidding Forms)</b> or another form approved by the Procuring agency/Employer prior to the bid submission.
	19.5	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.
	19.6	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> .
	19.7	Unsuccessful bidders' Bid Security will be discharged or returned as promptly as possible, however in no case later than thirty (30) days after the expiration of the period of Bid Validity prescribed by the Procuring agency/Employer pursuant to <b>ITB 18</b> . The Procuring agency/Employer shall make no claim to the



		<p>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



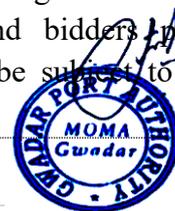
		bidding documents, including the basic technical design as indicated in the specifications. In addition to submitting the basic bid, the bidder shall provide all information necessary for a complete evaluation of the alternative by the Procuring agency/Employer, including technical specifications, breakdown 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 an original and the number of copies of the bid as indicated in the <b>BDS</b> , clearly marking each <b>“ORIGINAL”</b> and <b>“COPY”</b> as appropriate. In the event of any discrepancy between them, the original shall prevail: <i>Provided that except in Single Stage One Envelope Procedure, the bid shall include only the copies of technical proposal.</i>
	22.2	The original and the copy (ies) of the bid shall be typed or written in indelible ink and shall be signed by the bidder or a person or persons duly authorized to sign on behalf of the bidder. This authorization shall consist of a written confirmation as specified in the <b>BDS</b> and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the bid, except for un-amended printed literature, shall be initialed by the person or persons signing the bid.
	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 Marking of Bids</b>	23.1	In case of Single Stage One Envelope Procedure, the bidder shall seal the original and each copy of the bid in separate envelopes, duly marking the envelopes as <b>“ORIGINAL”</b> and <b>“COPY”</b> . The envelopes shall then be sealed in an outer envelope securely sealed in such a manner that opening and resealing cannot be achieved undetected. <b>Note:</b> <i>The envelopes shall be sealed and marked in accordance with the bidding procedure adopted as referred in Rule-36 of Public Procurement Rules, 2004.</i>
	23.2	The inner and outer envelopes shall:



		<p>a) be addressed to the Procuring agency/Employer at the address given in the <b>BDS</b>; and</p> <p>b) bear the title of the subject procurement or project name, as the case may be as indicated in the <b>BDS</b>, the Invitation for Bids (ITB) title and number indicated in the <b>BDS</b>, and a statement: “<b>DO NOT OPEN BEFORE</b>”, to be completed with the time and the date specified in the <b>BDS</b>, pursuant to <b>ITB 24.1</b>.</p>
	23.3	<p>In case of Single Stage Two Envelope Procedure, The Bid shall comprise two envelopes submitted simultaneously, one called the Technical Proposal and the other Financial Proposal. Both envelopes to be enclosed together in an outer single envelope called the Bid. Each Bidder shall submit his bid as under:</p> <p>a) Bidder shall submit his <b>TECHNICAL PROPOSAL</b> and <b>FINANCIAL PROPOSAL</b> in separate inner envelopes and enclosed in a single outer envelope.</p> <p>b) <b>ORIGINAL</b> and each copy of the Bid shall be separately sealed and put in separate envelopes and marked as such.</p> <p>c) The envelopes containing the <b>ORIGINAL</b> and copies will be put in one sealed envelope and addressed / identified as given in <b>ITB 23.2</b>.</p>
	23.4	<p>The inner and outer envelopes shall:</p> <p>a) be addressed to the Procuring agency/Employer at the address provided in the <b>BDS</b>;</p> <p>b) bear the name and identification number of the contract as defined in the <b>BDS</b>; and provide a warning not to open before the time and date for bid opening, as specified in the <b>BDS</b> pursuant to <b>ITB 24.1</b>.</p> <p>c) In addition to the identification required in <b>ITB 23</b> hereof, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared “late” pursuant to <b>ITB 25</b>.</p>
	23.5	<p>If all envelopes are not sealed and marked as required by <b>ITB 23.2</b>, <b>ITB 23.3</b> and <b>ITB 23.4</b> or incorrectly marked, the Procuring agency/Employer will assume no responsibility for the misplacement or premature opening of bid.</p>
<b>24. Deadline for Submission of Bids</b>	24.1	<p>Bids shall be received to the Procuring agency/Employer no later than the date and time specified in the <b>BDS</b>.</p>
	24.2	<p>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.</p>



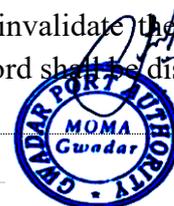
<b>25. Late Bids</b>	25.1	The Procuring agency/Employer shall not consider for evaluation of any bid that arrives after the deadline for submission of bids, in accordance with <b>ITB 24</b> .
	25.2	Any bid received by the Procuring agency/Employer after the deadline for submission of bids shall be declared late, recorded, rejected and returned unopened to the bidder.
<b>26. Substitution and Modification of bids</b>	26.1	A bidder may substitute or modify his bid after it has been submitted, provided that written notice of the substitution or modification of the bid, is received by the Procuring agency/Employer prior to the deadline for submission of bids.
	26.2	Revised bid may be submitted after the substitution or modification made in the original bid in accordance with the provisions referred in <b>ITB 22</b> .

**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 a attendance sheet as a proof of their attendance.
	27.2	First, envelopes marked " <b>WITHDRAWAL</b> " shall be opened and read out and the envelope with the corresponding bid shall not be opened, but returned to the bidder. No bid withdrawal shall be permitted unless the corresponding withdrawal notice contains a valid authorization to request the withdrawal and is read out at bid opening.
	27.3	Second, outer envelopes marked " <b>SUBSTITUTION</b> " shall be opened. The inner envelopes containing the Substitution Bid shall be exchanged for the corresponding Original Bid being substituted, which is to be returned to the bidder unopened. No envelope shall be substituted unless the corresponding Substitution Notice contains a valid authorization to request the substitution and is read out and recorded at bid opening.
	27.4	Next, outer envelopes marked " <b>MODIFICATION</b> " shall be opened. No Technical Proposal and/or Financial Proposal shall be modified unless the corresponding Modification Notice contains a valid authorization to request the modification and is read out and recorded at the opening of the bids. Any modification shall be read out along with the Original Bid except in case of Single Stage Two Envelope Procedure where only the Technical Proposal, both Original as well as Modification, are to be opened, read out, and recorded at the opening. Financial Proposal, both Original and Modification, will remain unopened till the prescribed financial bid opening date.



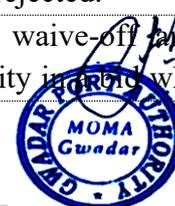
	27.5	Other envelopes holding the bids shall be opened one at a time, in case of Single Stage One Envelope Procedure, the bidders' names, the bid prices, the total amount of each bid and of any alternative bid (if alternatives have been requested or permitted), the presence or absence of Bid Security, Bid Securing Declaration and such other details as the Procuring agency/Employer may consider appropriate, will be announced by the Procurement Evaluation Committee.
	27.6	In case of Single Stage Two Envelope Procedure, 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 in custody of the Procuring agency/Employer until the specified time of their opening.
	27.7	The envelopes holding the Technical Proposals shall be opened one at a time, and the following read out and recorded: (a) the name of the bidder; (b) whether there is a modification or substitution; (c) the presence of a Bid Security or Bid Securing Declaration, if required; and (d) 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	No bid will be rejected at the time of bid opening except for late bids which will be returned unopened to the bidder, pursuant to <b>ITB 25</b> .
	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	In case of Single Stage -Two Envelop Bidding Procedure, after the announcement of technical evaluation report, the Procuring agency/Employer, shall at a time within the bid validity period, publicly open the financial proposals of the technically responsive bidder only. The financial proposal of bidders found technically non-responsive shall be returned un-opened to the respective bidders after seven days of the announcement of technical evaluation report, except 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 writing or 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 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> </ul>

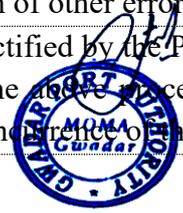


		<p>f) terms and conditions of bidding documents.</p> <p>g) change in the ranking of the bidder</p>
	29.4	From the time of bid opening to the time of Contract award if any bidder wishes to contact the Procuring agency/Employer on any matter related to the bid it should do so in writing or in electronic 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	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.
	30.4	The Procuring agency/Employer may waive off any minor informality, nonconformity, or irregularity in a bid which does



		<p>not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.</p> <p><b>Explanation:</b> <i>A minor informality, non-conformity or irregularity is one that is merely a matter of form and not of substance. It also pertains to some immaterial defect in a Bid or variation of a bid from the exact requirements of the invitation that can be corrected or waived without being prejudicial to other bidders. The defect or variation is immaterial when the effect on quantity, quality, or delivery is negligible when contrasted with the total cost or scope of the 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> <ul style="list-style-type: none"> <li>(a) <i>Submit the number of copies of signed bids required by the invitation;</i></li> <li>(b) <i>Furnish required information concerning the number of its employees;</i></li> <li>(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></li> </ul>
30.5		<p>Provided that a Technical Bid is substantially responsive, 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</b> of 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 <del>100%</del> procedure for the correction of errors and, with, the concurrence of the bidder,</p>



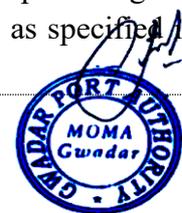
		shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount, its bid shall be rejected after forfeiture of Bid Security or execution of the Bid Securing Declaration, as the case may be, in accordance with <b>ITB 19.9</b> .
<b>33. Conversion to Single Currency</b>	33.1	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 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.
	33.2	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.
	33.3	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> .
<b>34. Evaluation of Bids</b>	34.1	The Procuring agency/Employer shall evaluate and compare only the bids determined to be substantially responsive, pursuant to <b>ITB 30</b> .
	34.2	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.
	34.3	The Procuring agency/Employer's evaluation of a bid will take into account: <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> </ul>



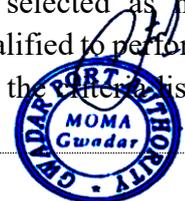
		<p>b) price adjustment for correction of arithmetic errors in accordance with <b>ITB 32.1</b>;</p> <p>c) converting the amount resulting from applying (a) and (b) above, if relevant, to a single currency in accordance with <b>ITB 33</b>;</p>
	34.4	The estimated effect of the price adjustment provisions 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 the contract satisfactorily, in accordance with the criteria listed in <b>ITB 12</b></p>



	39.3	<p>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.</p>
	39.4	<p>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.</p> <p><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></p>
	39.5	<p>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.</p>



## 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>



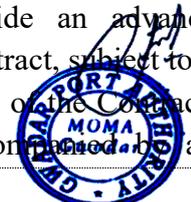
<p><b>43. Variations</b></p>	<p>43.1</p>	<p>The Engineer shall make any variation in the quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:</p> <ul 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> </ul> <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>
<p><b>44. Instructions for variations</b></p>	<p>44.1</p>	<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>



<p><b>45. Valuation of Variations</b></p>	<p>45.1</p>	<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 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>.</p>
<p><b>46. Notification of Award</b></p>	<p>46.1</p>	<p>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.</p>
	<p>46.2</p>	<p>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).</p>
	<p>46.3</p>	<p>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>.</p>
	<p>46.4</p>	<p>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>.</p>



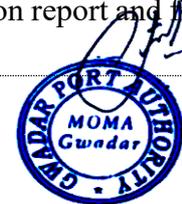
47. Signing of Contract	47.1	Promptly after notification of award, procuring agency/Employer shall send the successful bidder the draft agreement, incorporating all terms and conditions as agreed by the parties to the contract.
	47.2	Immediately after the Redressal of grievance by the GRC, and after fulfillment of all condition's 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.
48. Performance Security (or Guarantee)	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	<p>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:</p> <ul style="list-style-type: none"> <li>(a) certified cheque, cashier's or manager's cheque, or bank draft;</li> <li>(b) irrevocable letter of credit issued by a scheduled bank of Pakistan or in the case of an irrevocable letter of credit issued by a foreign bank, the letter shall be confirmed or authenticated by a scheduled bank of Pakistan;</li> <li>(c) bank guarantee confirmed by a reputable local bank or, in the case of a successful foreign bidder, bonded by a foreign bank; or</li> <li>(d) surety bond callable upon demand issued by any reputable surety or insurance company.</li> </ul> <p>Any Performance Guarantee submitted shall be enforceable in Pakistan.</p>
	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).
49. Advance Payment	49.1	Advance payment will be provided to the bidder in percentage and in the manner as agreed by the both parties in terms of Conditions of the Contract.
	49.2	The Procuring agency/Employer will provide an advance payment as stipulated in the Conditions of Contract, subject to a maximum amount, as stated and/or Conditions of the Contract. The advance payment request shall be accompanied by an



		advance payment security (guarantee) in the form provided in Section X. For the purpose of receiving the advance payment, the bidder shall make and estimate of, and include in its bid, the expenses that will relate to the purchase of equipment, machinery, materials, and on the engagement of labor during the first month beginning with the date of the Procuring agency/Employer’s “Notice to Commence” as specified in the SCC.
<b>50. 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>51. 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**

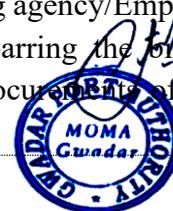
<b>52. Constitution of Grievance Redressal</b>	52.1	Procuring agency/Employer shall constitute a Grievance Redressal Committee (GRC) comprising of odd number of persons with proper power and authorization to address the complaint. The GRC shall not have any of the members of Procurement Evaluation Committee. The committee must have one subject specialist depending the nature of the procurement.
<b>53. 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**

<b>54. Mechanism of Blacklisting</b>	54.1	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;
	54.2	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 procurement of all the procuring agencies.



	54.3	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.
	54.4	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.
	54.5	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.
	54.6	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.



	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 debarring 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: Gwadar Port Authority                      The subject of procurement is: Infrastructure work of Off-Dock Terminal at Gwadar                      Period for completion of the works: 12 months                      Commencement date execution of the works: issuance of letter of commencement                      Type of Procurement: National competitive bidding, Single Stage two envelop</p>
<b>2.</b>	<b>2.1</b>	<p>Financial year for the operations of the Procuring agency/Employer: 2025-2026 &amp; 2026-2027                      Name of Project: Infrastructure work of Off-Dock Terminal at Gwadar                      Name of financing institution: Federal PSDP Project</p>
<b>3.</b>	<b>3.1</b>	<p>Maximum number of members in the joint venture, consortium shall be: [N/A].</p>

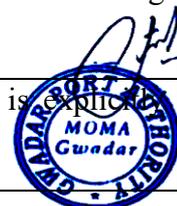


## B. Bidding Documents

4.	7.2	The number of copies to be completed and returned is one original and [ <i>one certified copy of original</i> ]
5.	8.1	The address for clarification of Bidding Documents is [Project Director Infrastructure work of Off-Dock Terminal at Gwadar, GPA Head Office Gwadar
	8.5	Pre-bid meeting will be held on 30 <sup>th</sup> October 2025 at 11 AM in the office of Project Director Infrastructure work of Off-Dock Terminal at Gwadar, GPA Head Office Gwadar

## 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> , bidder must meet the technical Qualification criteria as per section-V and provide the required documents.
8.	11.5 (c)	Other procurement specific documentation requirements are: Nil
9.	15.5	The bid price shall be adjusted in accordance with Appendix A – Formula for Price Adjustment.
10.	15.6	Name of the works Infrastructure work of Off-Dock Terminal at Gwadar The identification No. As per BOQ The No. and identification of lots (contracts) comprising this open competitive bid as per BOQ
11.	16.1	The currency of the Bid shall be: Pakistani Rupees
12.	18.1	The Bid Validity period shall be 90 days.
13.	19.1	The amount of Bid Security shall be (2%)  The currency of the Bid Security shall be: Pakistani Rupees Or Bid Securing Declaration is not applicable
14.	19.3	The Bid Security shall be in the form of: Bank Instrument (in favour of Gwadar Port Authority)
15.	19.3 (c)	Other forms of security are: Nil
16.	20.1	Alternative Bids to the requirements of the Bidding Documents: N/A
17.	20.2	If alternative scheduled for execution of work is explicitly invited



18.	22.1	The number of copies of the Bid to be completed and returned shall be [01 number].
19.	22.2	The written confirmation of authorization to sign on behalf of the Bidder shall consist of:

#### D. Submission of Bids

20.	23.2 (a)	Bid shall be submitted In the office Project Director “Infrastructure work of Off-Dock Terminal, GPA Head Office Gwadar Street address: Pak-China Friendship Road at Gwadar Building/Plot No. <i>GPA Head Office Gwadar</i> Floor/Room No.: 4 <sup>th</sup> Floor GPA Head Office  City/Town: Gwadar Balochistan
21.	23.2 (b)	Title of the subject Procurement or Project name: Infrastructure work of Off-Dock Terminal at Gwadar  ITB title and No: Time and date for submission: 7 <sup>th</sup> November 2025 11:00AM
22.	24.1	The deadline for Bid submission is  a) Day: <i>Friday 7<sup>th</sup> November 2025</i>  b) Date: <i>7<sup>th</sup> November 2025</i>  c) Time: <i>11:00AM</i>

#### E. Opening and Evaluation of Bids

23.	27.1	The Bid opening shall take place at:  Street address: <i>In the Office of Project Director Infrastructure work of Off-Dock Terminal at GPA Head Office Gwadar</i> Building/Plot No. <i>GPA Head Office</i> Floor/Room No: 4 <sup>th</sup> Floor City/Town: <i>Gwadar</i> Country: Pakistan Day : <i>Friday</i> Date: 7 <sup>th</sup> November 2025 Time : <i>11:30AM</i>
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24.	33.2	The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid prices expressed in various currencies is: Pakistan Rupees (PKR)  The source of exchange rate shall be: N/A  The date of exchange rate shall be: N/A
25.	33.3	The bids shall be quoted in (Pakistani Rupees)
26.	34	<b>Evaluation Techniques</b> <b>Least Cost Based Selection (LCBS)</b>  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.
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. N/A
28.	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: N/A
29.	35	Domestic preference to apply. Preference to domestic or national suppliers or contractors shall be provided in accordance with policies of the Federal Government
30.	38.2	Sub-contracting: N/A
<b>F. Award of Contract</b>		
31.	48	The Performance Security (or guarantee) shall be: 10% of the Contract Price
32.	48	The Performance Security (or guarantee) shall be in the form of Bank Guarantee or Insurance Guarantee as per PEC
<b>G. Review of Procurement Decisions</b>		
33.	53.6	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



## 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: another 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.



## **2. Evaluation Criteria (Technical Proposals)**

i. In addition to the criteria listed in ITB 34.3 the following technical qualification criteria shall be applied for the evaluation of bids (Technical Proposals/bids):

### **A) Mandatory Requirement:**

- i. Valid PEC registration in Category C-3 with specialized Codes: CE-01, CE-03, CE-10 & EE-04
- ii. National Tax Number Certificate (FBR) with Sale Tax registration & Tax return (FY-2024-2025)
- iii. Registration in Balochistan Revenue Authority
- iv. AFFIDIVAT (on stamp paper) regarding not blacklisting in any organization attested by notary public
- v. AFFIDIVAT (on stamp paper) regarding sole proprietorship of firm attested by notary public
- vi. Integrity Pact (on stamp Paper) dully signed/stamp by owner of firm or authorized person attested by notary public

If any bidder will not provide/attach above-mentioned documents (serial No-i to vi) will be declared technically disqualified and their documents cannot be examined for detail evaluation.

### **B) Evaluation Criteria (Technical):**

The bidders/contractors to be required to qualify by meeting the minimum qualifying threshold in individual categories and overall qualification points as well (Minimum qualifying threshold is 60%):

### **C) Detailed Evaluation**

After the initial screening/scrutiny of all applicants, a detailed evaluation of the bidders shall be undertaken using the following criteria based on the scoring system as follows:

Category	Points	
	Maximum	Minimum Acceptable
Financial	20	12
Experience	60	36
Personnel	10	06
Equipment	10	06

To qualify, applicants must receive not less than the specified minimum acceptable points for each category and aggregate of minimum 60 points.

### **D) Financial Capability**

Points shall be awarded under this category based on the following criteria:

S.	Description	Max Points Assigned	Criteria for Points Obtained
a)	Available Bank Credit Line	03	<ul style="list-style-type: none"> <li>• One (01) Point is given if the available bank credit line limit is equal to Rs.20 million. One (1.0) point is given for every Rs. 5 million increases in the Credit Line.</li> <li>• Full Points are given in case the limit is Rs30 million or more. No point will be granted if credit line is less than Rs.20 million</li> </ul>
b)	Average Working Capital in last 3 years	06	<ul style="list-style-type: none"> <li>• Three (03) Points are given if the average working capital for last three years is equal to Rs.100 million</li> </ul>

			(each year). Additional 1 point is given for every Rs20 million increase in the working capital. <ul style="list-style-type: none"> <li>• Full Points are given in case of working capital for the last three years is Rs 160 million or more. No point will be granted if working capital is less then Rs.100 million</li> </ul>
c)	Average Annual Turnover in last 3 years	05	<ul style="list-style-type: none"> <li>• Three (03) Points are given if the average annual turnover for last three years is equal to Rs100 million. One (01) additional point is given for every Rs 20 million increase in the average annual turnover.</li> <li>• Full Points are given in case of Average Annual Turnover for the last three years is Rs 160 million or more.</li> </ul>
d)	Income Tax Return of last three financial years	06	<ul style="list-style-type: none"> <li>• No points will be given if any one Income Tax Returns is not attached. Full points will be given in case of submission of last three-year tax returns.</li> </ul>
<b>Total Points Allocated</b>			<b>20</b>

### **E) Experience Capability**

Information regarding similar works & any works completed during last three years shall be supported by documents such as Letter of commencement/work order/letter of acceptance, Taking Over/Completion Certificate, showing the cost of works at award/completion:

S #	Experience	Points
i.	One Project/work of Construction of Boundary Wall amounting to Rs.70 to Rs.100 million or more completed during last 03 years (two project each project will be granted 7.5 point)	15
ii.	Project/work construction of Road amounting to Rs.100 million or more completed in last three year (two project each project will be granted 7.50 point)	15
iii.	Projects/work related to construction of Building costing Rs.100 million or more completed last three year (two project each project will be granted 7.50 point)	15
iv.	Any projects/work related to construction of buildings costing Rs.200Million or more in hand in Gwadar (two project each project will be granted 7.50 point)	15
<b>Maximum Points</b>		<b>60</b>



## F) Personnel Capability

Personnel will be evaluated on the basis of following points:

Key Personnel	Points (maximum)
i. Construction/Project Manager (Civil)	03
ii. Project Engineer (Civil)	03
iii. Sub-Engineer (Civil)	02
iv. Quantity Surveyor/ Surveyor	02
<b>Total Points (maximum)</b>	<b>10</b>

Points for personnel will be given on the basis of the following criteria:

**i. Construction/Project Manager**  
(Bachelor of Engineering in Civil Engineering)

Qualification & Experience	Points
B.E./ B.Sc. Civil Engineering with 10-year experience and if experience is less than 10 years than 1 Points will be granted (experience will be counted as per PEC registration date)	03

**ii. Project Engineer (Civil)**  
(Engineering in Civil Engineering)

Qualification & Experience	Points
B.E./ B.Sc. (Civil Engineering) with 5 year experience and if experience is less than five year than 1 Points will be granted. (experience will be counted as per PEC registration date)	03

**iii. Sub-Engineer (Civil)**  
(Diploma in Civil Engineering)

Qualification & Experience	Points
Diploma (Civil Engineering) with 5 year experience and if experience is less than five year than 01 Points will be granted.	02

**iv. Quantity Surveyor or Surveyor**  
(Diploma in Civil Engineering or other approved survey certificate)

Qualification & Experience	Points
Diploma in Civil Engineering or other approved survey certificate with 5-year experience and if experience is less than five year than 1 Points will be granted.	02



**G) Equipment Capability**

<b>Equipment Name</b>	<b>Required Quantity</b>	<b>Points</b>
1. Excavator Machine	1	01
2. Concrete Mixer Machine	2	01 (0.5 point Each)
3. Generators (10 KVA) or more	1	01
4. Total Station Survey instrument	1	01
5. Loader	1	01
6. Dumper	1	01
7. Roller Machine	1	01
8. Water Bowzer	1	01
9. Tractor with Trolley	1	01
10. Mobile Crane 4 to 5 Ton capacity	1	01
<b>Maximum Points</b>		<b>10</b>

Bidder to provide documentary evidence of above-mentioned equipment.



**SECTION V: SCOPE OF WORKS, BILL OF QUANTITIES TECHNICAL SPECIFICATIONS & DRAWINGS,**

**Scope of Works**  
(Describe Scope of Work)

The major components of Infrastructure work of Off-Dock Terminal at Gwadar is as under:

1. Construction of Boundary Wall of 100 Acre Land as per BOQ
2. Construction of Internal Road as per BOQ
3. Sand Filling & Levelling as per BOQ
4. Construction of Office Building for Off-Dock Terminal as per BOQ
5. Construction of Base for warehouse as per BOQ
6. Security arrangement (To provide private security Guard) as per BOQ



## **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 PEC standard/ FIDIC as per actual work-done at site.



# BILL OF QUANTITIES

GWADAR PORT AUTHORITY  
INFRASTRUCTURE WORK OF OFF-DOCK  
TERMINAL AT GWADAR

## GRAND SUMMERY OF COST

S.No	Description of Work	Amount	
		Rs.	
1	Construction of Boundary Wall		
2	Sand Filling & Levelling		
3	Road Work		
	a) Internal Roads		
4	Office for Off-Dock Terminal		
	a) Civil Works		
	b) Plumbing Works		
	c) Electrical Works		
5	Civil Works for Base of warehouse		
6	Provision Of Security		
TOTAL COST= RS			
NET TOTAL=			

In MILLION (Rs.)

(Rupees



Bidder Sign & Stamp

**BILL OF QUANTITIES**

GWADAR PORT AUTHORITY

INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR

**CONSTRUCTION OF BOUNDARY WALL**

(1) BOUNDARY WALL

COST ESTIMATE

S.No	DESCRIPTION	QTY	UNIT	RATE	AMOUNT
<b>CIVIL WORKS</b>					
1	Excavation in foundation in shingle or gravel soil of buildings, bridges and other structures, depth up to 4 meters including degbelling dressing refilling around structures with excavated earth watering and ramming lead up to 30 m lift up to 1.5m	92432.00	CFT		
2	Providing and laying cement concrete 1:4:8 (1 cement 4 sand 8 crush) using crushed size 19mm (3/4") and down gauge in foundation including levelling compacting and curing	3698.75	CFT		
3	Providing and fabricating and laying Tor steel grade 40 having yeild strength equal to 60000 psi reinforcement for all kind of RCC work in foundation , plinth and ground floor including the cost of straightening , removal of rust , cutting bending , binding wastage and providing such overlap as are not shown on the drawings , the cost of building wire and precast 1:2:4 cement concrete spacer block or MS chairs for binding and holding the reinforcement in position is inclusive up to 5m (14.6 ft)	108.995	KG		
4	Providing and laying cement concrete 1:2:4 (1 cement 2 sand 4 crush) using crushed size 19mm (3/4") and down gauge in foundation bed including levelling, form work, compacting, curing, and removal of form work.	14795.00	CFT		
5	Providing and laying 1:2:4 cement concrete using shingle or bajri 19mm and down gauge in plinth band, door band and roof band of required shape or section including formwork and its removal, compacting and curing in basement and ground floor but excluding the cost of reinforcement.	7343.20	CFT		
6	Providing and laying 1:3:6 cement concrete block masonry using Coarse Sand and Approved crushed aggregate 3/4" (19mm) & down gauge including scaffolding, raking out joints and curing in basement.	82462.75	CFT		
7	Providing and laying in Situ cement concrete 1:2:4 (1 cement 1.5 sand 3 crush) using crush size 19mm (3/4") and down gauge in Columns concrete including formwork compacting curing and removal of form work	11184.00	CFT		
8	19mm (3/4") thick cement plaster 1:4 cement mortar ratio on wall and columns in basement plinth and ground floor including making edges corner and curing.	287462.00	SFT		
9	Applying weather resistant paint coating such as ICI weather shield, Berger weather coat or equivalent to interior or exterior walls or ceiling including supplying all labor, materials, scaffoldings and removal of debris etc. @ at least 3.50 liter per 10	178212.00	SFT		
10	Providing M.S. Tees, angles and flats including fixing in position.	1000.00	Kg		
11	Providing and fixing First class deodar wood 3" thick gate as per design approved by the Engineer in charge with necessary male and female hinges, stopper, locking arrangements, cutting wall and making good the same as required.	232.00	SFT		
12	Painting with ICI/Berger or equivalent super gloss synthetic enamel paint in two or more coats as per manufacturer's instructions on wood work over and including the cost of priming coat, surface preparation, rubbing down smooth, knotted, filling cracks, holes 1.65 Liter per 10 Sq.m) and joints in ground floor or basement. (@ at least	464.00	SFT		
<b>SOLAR LIGHT FIXTURES COMPLETE SYSTEM</b>					
13	Supply, installation testing and commissioning of solar LED street lights 180W all in one suitable for the project requirement with 180lm/w(+/-5%) lumens. Typically, around 6000k or 6500k, providing a natural, bright white light. Fully IP65 with corrosion resistant diecast aluminum housing silicon gasket, thermally hardened glass. Light distribution of luminaire should be symmetric and optics should be anti-dust exposed lenses. typically uses a high efficiency monocrystalline silicon solar panel. With built in Lithium Ferro Phosphate (LifePO4) battery and time and brightness control intelligent charge controller to operate dusk to dawn sensor for automatic on/off and can be equipped with remote control for mode adjustments. with at least 10-12 hrs backup.	10.00	No		
Total Amount to be carried out in Summery					



Bidder Sign &amp; Stamp

**BILL OF QUANTITIES****GWADAR PORT AUTHORITY****Infrastructure Work OFF-DOCK TERMINAL****(2) Sand Filling & Levelling**

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	<u>CONTAINER STACKING AREA</u>				
1	Levelling and dressing the ground by cutting and filling of earth in depth up to 6 inches including consolidating.	Sq.m.	40000		
2	Making earthen embankment with earth taken from approved borrow pits i/c cost of excavation, placing in layers not exceeding 9" (230 mm) in depth i/c dressing top and sides of the bank within a lift of 5ft (1.5 m) (Excluding the royalty of earth, Compaction and its carriage)	Cum	49200		
3	Compaction of earthen embankments to full depth and width below sub grade level by mechanical means in layers not exceeding 8" (200 mm) in depth at optimum moisture content i/c watering and mixing by mechanical means. The sub grade embankment shall be compacted to at least 95% modified AASHTO maximum dry density for their full depth and width.	Cum	49200		
Total Amount to be carried out in Summery					

Bidder Sign &amp; Stamp



## BILL OF QUANTITIES

### GWADAR PORT AUTHORITY

#### Infrastructure Work OFF-DOCK TERMINAL

S.No	Description of Work	Quantities		Rate	Unit	Amount
<b>Road Works</b>						
1	Preparation and compaction up to 95% modified AASHTO of natural ground up to a depth of 8" (20mm) in ordinary soil.	16500.00	Sqm		P.Sqm	
2	Excavation or cutting to a required grade, camber and side slopes including dressing top and sides and disposal of excavated material within a lift of 5ft (1.5m) and lead up to 100 ft. (30m)	2714.40	Cum		P.Cum	
3	Extra if excavated earth is required to be filled in road embankment by placing it in layers not exceeding 9" (230mm) in depth including dressing top and sides of the bank.	2714.40	Cum		P.Cum	
4	Making earthen embankment with earth taken from approved borrow pits i/c cost of excavation, placing in layers not exceeding 9" (230 mm) in depth i/c dressing top and sides of the bank within a lift of 5ft (1.5 m) (Excluding the royalty of earth, Compaction and its carriage)	21019.50	Cum		P.Cum	
5	Compaction of earthen embankments to full depth and width below sub grade level by mechanical means in layers not exceeding 8" (200 mm) in depth at optimum moisture content i/c watering and mixing by mechanical means. The sub grade embankment shall be compacted to at least 95% modified AASHTO maximum dry density for their full depth and width.	21019.50	Cum		P.Cum	
6	Providing and laying pit run gravel in sub base or base course of any thickness to required grade and camber including watering and compacting with road roller with all lead and lift. (Compacted thickness to be measured)	2981.9	Cum		P.Cum	
7	Supplying and laying graded aggregated base course of crushed stone of approved quality, i/c placing , mixing, spreading, watering, and compacting base course to required depth, camber and grade to achieve 100% max modified AASHTO dry density conforming to AASHTO classification T- 180 with mechanical means and with all lead and lift .(Carriage of crushed stone is included in the rate within 5 km of project premises.)(S I No 21-17)	1232.6	Cum		P.Cum	
8	Carriage of 100 Cft (2.83 Cum) of all material like Clay, Stone, aggregate, spawl, kankar lime (unslaked), surkhi, etc. or 150 Cft. (4.25 cu.m) of timber, by truck or by any other means owned by the contractor up to 16km from Quarry					
	Sub Base	2981.9	Cum		P.Cum	
	Aggregate Base	1232.6	Cum		P.Cum	
9	Providing and applying prime coat of liquid asphalt (cut back) of any approved grade using asphalt (cut back) i/c cleaning and brooming of road surface.	8052	Sqm		P.Sqm	
10	Providing and laying hot mix bituminous concrete in road pavement laid with mechanical paver and mixed in central mixing plant in required thickness and density, rolled hot with different types of rollers complete as per specification and job mix formula and design in single layer in 2" (50mm) compacted thickness.	8052	Sqm		P.Sqm	



**BILL OF QUANTITIES****GWADAR PORT AUTHORITY****Infrastructure Work OFF-DOCK TERMINAL**

S.No	Description of Work	Quantities		Rate	Unit	Amount
<b>Road Works</b>						
11	P/L Road marking with T.P (Thermoplastic) reflective paint 6" wide complete in all respect.	2750.000	RM		P.RM	
12	REFLECTORISED PLASTIC PAVEMENT STUD (RAISED PROFILE TYPE - DOUBLE).	1650.00	No		Each	
<b>CONSTRUCTION OF DOUBLE CELL PIPE CULVERT 24"DIA</b>						
13	Excavation in foundation of buildings and bridges including layout, dressing, refilling around structures with excavated earth, watering & ramming lead up to 100 ft. (30m) & lift up to 5 ft. (1.5m)	37.64	Cu.m		P.Cum	
14	Providing and laying plain machine mixed cement concrete using coarse sand and crushed aggregate having maximum size upto 1-1/2" (38mm) & down gauge in foundation including levelling, compacting and curing.	3.66	Cu.m		P.Cum	
15	Providing and laying 1:2:4 cement concrete using approved coarse sand and crushed aggregate 3/4" (19mm) and down gauge in sills and Bed Plate including formwork and its removal, compacting. And curing	6.58	Cu.m		P.Cum	
16	R.C.C pipe with bell & spigot or tongued & grooved joint conforming to ASTM C-76 class II wall B or BS 3911 Part I class M including cost of reinforcement.	21.94	RM		P.Rm	
17	Providing and laying in situ cement concrete using approved coarse sand and crushed aggregate having maximum size upto 3/4" (19mm) and down gauge in foundation including formwork using wooden braces and without wall ties, compaction, curing and removal of formwork	14.31	Cu.m		P.Cum	
18	Providing and laying 1:2:4 cement concrete using approved coarse sand and crushed aggregate 3/4" (19mm) and down gauge in balustrade of stairs or balcony, sun breakers, sun shades, parapets and eave boards upto 3" (75 mm) of required shape or section Cum. including formwork & its removal, compacting and curing in basement and ground floor.	0.70	Cu.m		P.Cum	
Total Amount to be carried out in Summery						

Bidder Sign &amp; Stamp



# BILL OF QUANTITIES

GWADAR PORT AUTHORITY

INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR

## CONSTRUCTION OF OFFICE BUILDING FOR OFF-DOCK TERMINAL

S.No	Description of Work	Qty	Unit	Rate	Amount
<b>CIVIL WORKS</b>					
1	Excavation in foundation of buildings and bridges including layout, dressing, refilling around structures with excavated earth, watering & ramming lead up to 100 ft. (30m) & lift up to 5 ft. (1.5m) with machinery	6512.00	Cft	P.Cft	
2	Providing and laying stone soling 6" thick with approved stone to required grade and camber including packing with spawls, chips, watering, compacting with road roller and with all lead and lift. (including royalty of Quarry).	185.00	Cft	P.Cft	
3	Providing and laying 1:4:8 in situ cement concrete using approved coarse sand and crushed aggregate having maximum size upto 1-1/2" (38mm) and down gauge in foundation including formwork and its removal, compaction and curing	212.19	Cft	P.Cft	
4	Providing and laying polythene sheet 0.13mm thick under floors for water proofing laid as per instructions of the Engineer in ground floor.	1091.03	Sft	P.Cft	
5	Providing, fabricating and laying deformed Grade 60 steel reinforcement (deformed bar) for all kinds of R.C.C work in foundation, plinth and ground floor including the cost of straightening, removal of rust, cutting, bending, binding, wastage and providing such over-laps as are not shown on the drawings. The cost of binding wire and cement concrete spacer blocks or chairs for binding and holding the reinforcement in position is inclusive upto 15 ft. (5m) height.	11380.95	Kg	P.Kg	
6	Providing and laying 1:2:4 cement concrete using coarse sand and crushed aggregate having maximum size up to 19 mm & down gauge in foundation i/c levelling, compacting and curing	570.63	Cft	P.Cft	
7	Providing and laying 1:2:4 cement concrete using approved coarse sand and crushed aggregate 3/4" (19mm) and down gauge in pillars and columns of any shape in super structure including compacting, curing, cost of form-work & its removal in basement and ground floor.	88.40	Cft	P.Cft	
8	P/L 1:3:6 cement concrete B/M 150mm thick using graded screened crushed stone 19mm (3/4") and down gauge in ground floor super structure including scaffolding, raking out joints and curing.	475.70	Cft	P.Cft	
9	Providing and laying 1:2:4 cement concrete using approved coarses and and crushed aggregate 3/4" (19mm.) and down gauge in plinth band, door band and roof band of required shape or section including form work and its removal, compacting and curing in basement and ground floor but excluding the cost of reinforcement.	409.54	Cft	P.Cft	
10	Providing and applying two coats of hot bitumen (maxphalt 80/100 or equivalent) using 1.22 kg per square meter for first coat and 1.00 kg per square meter for second coat including cleaning surface, heating and spraying asphalt on concrete faces.	1639.95	Sft	P.Sft	
11	Filling, watering and compacting earth under floors in layers not exceeding 8 inches in thickness. With new earth excavated from outside, lead up to 100 ft. (30m) and lift up to 5 ft. (1.5m) including royalty of Clay	13104.00	Cft	P.Cft	
12	Providing and laying stone soling 6" thick with approved stone to required grade and camber including packing with spawls, chips, watering, compacting with road roller and with all lead and lift. (including royalty of Quarry).	865.50	Cft	P.Cft	
13	Providing and laying 1:4:8 in situ cement concrete using approved coarse sand and crushed aggregate having maximum size upto 1-1/2" (38mm) and down gauge in foundation including formwork and its removal, compaction and curing	576.42	Cft	P.Cft	



# BILL OF QUANTITIES

GWADAR PORT AUTHORITY

INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR

## CONSTRUCTION OF OFFICE BUILDING FOR OFF-DOCK TERMINAL

S.N	Description of Work	Qty	Unit	Rate		Amount
	<b>CIVIL WORKS</b>					
14	Providing and laying 2" (50mm) thick damp proof course with 1:2:4 cement concrete Coarse Sand and crushed aggregate 1/2" (13mm) and down gauge including applying a coat of hot bitumen 80/100 or equivalent using 1.71 Kg per sq.m. and laying single layer of polythene sheet 0.13 mm thick (500 gauge) on damp proof course, including cleaning surface and spraying.	267.67	Sft		P.Sft	
15	Providing and laying 1:2:4 cement concrete using approved coarse sand and crushed aggregate 3/4" (19mm) and down gauge in pillars and columns of any shape in super structure including compacting, curing, cost of form-work & its removal in basement and ground floor.	170.00	Cft		P.Cft	
16	P/L 1:3:6 cement concrete B/M 150mm thick using graded screened crushed stone 19mm (3/4") and down gauge in ground floor super structure including scaffolding, raking out joints and curing.	2443.06	Cft		P.Cft	
17	Providing and laying 1:2:4 cement concrete using approved courses and and crushed aggregate 3/4" (19mm.) and down gauge in plinth band, door band and roof band of required shape or section including form work and its removal, compacting and curing in basement and ground floor but excluding the cost of reinforcement.	320.25	Cft		P.Cft	
18	Providing and laying 1:2:4 cement concrete using approved coarse sand and crushed aggregate 3/4" (19mm) and down gauge in beams, lintels and cantilevers of required shape or section including formwork and its removal compacting and curing in basement and ground floor.	319.50	Cft		P.Cft	
19	Providing and laying 1:2:4 cement concrete using approved coarse sand and crushed aggregate 3/4" (19mm) and down gauge in slabs including formwork and its removal, compacting and curing.	1233.00	Cft		P.Cft	
20	3/4 inch (19mm) thick cement plaster using Coarse Sand on walls and columns in basement, plinth and ground floor including making edges, comers and curing.	10709.00	Sft		P.Sft	
21	Cement plaster using Coarse Sand on soffits of ceiling, cantilever slabs, sides and soffits of beams, in basement and ground floor including making edges, corners and curing	2272.00	Sft		P.Sft	
22	Providing and fixing First class wood built in frame of required size with 1/2" (13mm) thick beading as stopper of the same for doors, windows, ventilators, windows, shelves and partitions. Kail wood	30.89	Cft		P.Cft	
23	Providing and laying 1/4" to 3/8" (6mm to 9mm) thick Glazed/ Matt tiles of any colour and size in ground floor laid over 1" (25mm) thick cement sand mortar base including jointing and washing the tiles with white cement slurry of matching color by using color pigment and curing.	2256.00	Sft		P.Sft	
24	Providing and laying 3/4"(19mm) thick Granite polished tiles of any size on floor of approved design in any color, shade and pattern in ground floor over 3/8" thick base cement sand mortar 1:3 including setting the tiles with Portland cement slurry over cement sand jointing and washing the tiles with cement slurry of matching color including grinding, rubbing, polishing & mortar cost	194.00	Sft		P.Sft	
25	Providing and fixing First class Teak wood shutters fully paneled with same wood and fixed with approved brass hinges and tower bolts.	273.00	Sft		P.Sft	
26	Providing and fixing locks with brass or specially supplied screws including Door Closers and Floor Hinges of approved design including cutting wood to required shape and size with two operating keys	12.00	No		Each	



**BILL OF QUANTITIES**

GWADAR PORT AUTHORITY

INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR

**CONSTRUCTION OF OFFICE BUILDING FOR OFF-DOCK TERMINAL**

S.No	Description of Work	Qty	Unit	Rate	Amount
	<b>CIVIL WORKS</b>				
27	Providing and fixing factory made uPVC fixed or openable glazed windows/ventilators comprising of uPVC multi-chambered frame and mullion (where ever)	390.00	Sft		P.Sft
28	Painting with ICI/Berger or equivalent plastic emulsion paint of approved shade in two or more coats as per manufacturer's instructions on plastered rendered and/or concrete surface over and including the cost of priming coat, surface preparation, dusting, rubbing down smooth, filling cracks, holes removing blisters and other imperfections in ground floor or basement. (@ at least 1.65 Liter per 10 Sq.m)	5212.00	Sft		P.Sft
29	Applying weather resistant paint coating such as ICI weather shield, Berger weather coat or equivalent to interior or exterior walls or ceiling including supplying all labour, materials, scaffoldings and removal of debris etc. @ at least 3.50 litre per 10	2918.50	Sft		P.Sft
30	Construction of Soakage pit 8ft deep for sewerage filled with stone boulders, complete in all respect as approved by the engineer incharge.	2.00	Nos		Each
Total Amount to be carried out in Summery					



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# BILL OF QUANTITIES

## GWADAR PORT AUTHORITY INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR CONSTRUCTION OF OFFICE BUILDING FOR OFF-DOCK TERMINAL

S.No.	Description of Work	Qty	Unit	Rate	Amount
<b>Plumbing Works</b>					
1	Providing and Installing uPVC pipe IIL, Dadex or equivalent make registered with PSQCA in tubewell bore hole and/or laying, cutting, jointing and testing uPVC pipe lines in trenches.				
	4" (100 mm) inner dia.	220.00	Rft		P.Rft
	6" (150 mm) inner dia.	200.00	Rft		P.Rft
2	Providing, laying, cutting, jointing, testing and disinfecting PPRC pipes confirming to ISO 4427, PN-20, complete in all respects with specials and valves etc. including all fittings, connections and jointing material				
	iii (25mm)	600.00	Rft		P.Rft
	iv (32mm)	150.00	Rft		P.Rft
	vi (50mm)	100.00	Rft		P.Rft
3	Providing and fixing squatting type water closet with integral treads ICL Boch/Karam Cera or approved equivalent make including cost of inlet pipe cistern and lid cistern kit, stop cock deluxe type and other accessories, fittings, brackets, PVC down pipe, rubber rings/washers, making requisite number of holes in walls, plinth and floor for pipe connection and making good with approved material.	4.00	Nos		Each
4	Providing and fitting superior quality C.P. or brass oxidized 1/2" (12mm) swan neck pillar cock (tap) of approved make. Single way	10.00	Nos		Each
5	Providing and fixing export quality glazed earthen ware wash basin manufactured by ICL Boch/Karam Cera or equivalent approved make with single hole chromium plated mixer tap 1/2" (15mm), pillar tap delux, stop cocks, C.I. or W.I. brackets 6" (150mm) built into walls 1.5" (40mm) C.P. brass waste with malleable iron or C.P. brass trap with malleable iron or brass union and making requisite number of holes in walls, plinth and floor for pipe connections and making good with approved material.	4.00	Nos		Each
6	Providing and fixing stainless steel sink Pakistan made with C.I. or W.I brackets 6" built in wall, 1.5" (40 mm) rubber plug,C.P. brass chain, C.P. brass waste, pillar tap 2-way deluxe, 1.5" dia malleable iron or C.P. brass trap and unions and making requisite number of holes in walls, plinth and floor for pipe connections and making good with approved material.	1.00	Nos		Each
	Providing and fixing bathroom accessories as per approved list of manufacturer including fixing with Rawal plug of approved quality complete in all respect.				
7	Providing and fixing soap dish.	4.00	Nos		Each
8	Providing and fixing approved quality C.P. brass toilet paper holder Master /Sonex or equivalent make.	4.00	Nos		Each
9	Providing and fixing Sonex/Master WC CR Shower including Connecting Flexible Pipe and bib cok including making requisite numbers of holes and making good with approved material.	4.00	Nos		Each
10	Providing and fixing superior quality gun-metal peet/gate valve (Class150) of approved make.				
	1" (25 mm) dia.	5.00	Nos		Each
	2" (50 mm) dia.	1.00	Nos		Each
11	Providing and fixing superior quality C.P. check valve of approved make for water supply or gas lines.	5.00	Nos		Each
12	Supply and install 55 gallons electric geyser	1.00	Nos		Each



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GWADAR PORT AUTHORITY  
INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR  
CONSTRUCTION OF OFFICE BUILDING FOR OFF-DOCK TERMINAL

S.No.	Description of Work	Qty	Unit	Rate	Amount
<b>Plumbing Works</b>					
13	Providing and fixing uPVC floor drain / Floor Gully of approved design with S.S. (304) grating with polish finish including requisite number of holes with pvc sleeve pipe in wall plinth or floor for pipe connection and making good the same as necessary to the structure complete including gasket and clamp complete.	10.00	Nos	Each	
14	Providing and fixing standing shower concealed in wall with approved quality control valves, mixer unit and moveable shower head.	2.00	Nos	Each	
15	Providing and fixing looking mirror of Belgium/Malaysian/ Indonesian glass with chromium plated screws.	4.00	Nos	Each	
16	Providing and fixing 1/2"(12mm) single hole superior quality C.P.mixer of approved make for wash hand basin, sink or shower.	5.00	Nos	Each	
17	Providing and fixing LDPE overhead tank manufactured by Dura or equivalent on top of any floor 300 gallons capacity	1.00	No	Each	
Total Amount to be carried out in Summery					

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INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR

CONSTRUCTION OF OFFICE BUILDING FOR OFF-DOCK TERMINAL

ELECTRIFICATION

S No	Description of Work	Qty:	Rate	Unit	Amount
1	Light circuit concealed /open wiring with length upto 75ft. (25m) from distribution board to point /switch with 3x2.5 Sq.mm PVC insulated single core copper conductor Pakistan Cables, Pioneer, New age or approved equivalent cables for offices /multi storied buildings. Concealed wiring with 3/4" (20mm) dia. Conduit and accessories such as bends, elbows, junction boxes etc.	25		P.Point	
2	Concealed /open wiring from point to switch with length up to 30ft.(10m) including any switch-to-switch wiring with 3x1.5 Sq.mm PVC insulated single core copper conductor Pakistan Cables, Pioneer, Newage or approved equivalent cables, Concealed wiring with 3/4" (20mm) dia. PVC conduit and accessories such as bends, elbows, junction boxes etc.	140		P.Point	
3	Supply and install 3-gang, 5 Amp, 250 Volt,. plate type molded Clipsal/Schneider or equivalent imported switch including appropriate size plastic box to be fixed recessed in wall	10		P/No.	
4	Supply and install 4-gang, 5 Amp, 250 Volt,. plate type molded Clipsal/Schneider or equivalent imported switch including appropriate size plastic box to be fixed recessed in wall	30		P/No.	
5	Supply and install combined 2/3 pin 5 Amps, 250 Volt switch socket unit including plastic box to be fixed recessed in wall	15		P/No.	
6	Supply and install combined 3 pin 15 Amps, 250 Volt switch socket unit including plastic box to be fixed recessed in wall 250 volt switch socket	20		P/No.	
7	Supply and install weather proof incandescent light fixture comprising die-cast aluminum body with front glass cover fixed to the body by means of stainless-steel screws and neoprene gasket, G.I. wire guard, 1 No 100W lamp, including all installation material Philips type or approved equivalent	4		P/No.	
8	Supply and install surface mounted fluorescent light fixture tube light with a 40W. Lamp TMS-140 Philips type or approved equivalent complete with ballast, power factor improvement capacitor, starter etc. and including all installation materials.	4.00		P/No.	
9	Surface mounted & wall mounted 15W LED Light Fixture, Color 4000K	41.00		P/No.	
10	Wall mounted 20W LED Mirror Light fixture, color 4000k.	4.00		P/No.	
11	25A 3-PIN Switch Socket Unit for AC	4.00		P/No.	
12	7W LED down light Fixture, Color 4000K	20.00		P/No.	
13	Supply and install 56" (1.42 m) sweep ceiling fan with fan hook and dimmer complete with all accessories	8		P/No.	
14	Supply and install 10" (250 mm) sweep exhaust fan including plastic louvers	3		P/No.	
15	Supply and install 20" (500 mm) sweep revolving bracket fan with guard.	4.00		P.No.	



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ELECTRIFICATION

S No	Description of Work	Qty:	Rate	Unit	Amount
16	Supply and install 25 sq.mm, 3.5 core, PVC insulated and sheathed multicore, 600/1000V cable with copper conductor directly clipped on surface of wall, column, beam, ceiling, etc. for power wiring	295.290		P.Rft	
17	Provide, install, test and commission recessed wall mounting type distribution board fabricated from 16 SWG steel sheet, powder coated with approved color back box comprising one incoming MCCBTP/ 60A and outgoing 9 single phase MCB of various capacity having overload & short circuit protection and of 6 KA braking capacity complete with internal wiring earthing, neutral link, termination blocks, phase indicating lights along with 500V voltmeter	1		P.No.	
Total Amount to be carried out in Summery					

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**BILL OF QUANTITIES****GWADAR PORT AUTHORITY****INFRASTRUCTURE WORKS OF OFF-DOCK TERMINAL****(5) Civil works for base of Warehouse**

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Providing, fabricating and applying at any height except where otherwise stated in the specific item of the Bill of Quantities including all material, labour & plant for the following items complete in all respect as per drawings, approved shop drawings, technical specifications, miscellaneous details and instructions by the Architect/Engineer.				
	<u>EARTH WORKS</u>				
1	Excavation in foundation of buildings and bridges including layout, dressing, refilling around structures with excavated earth, watering & ramming lead upto 100 ft. (30m) & lift upto 5 ft. (1.5m)	Cum.	1500		
2	Filling, watering and compacting earth under floors in layers not exceeding 8 inches in thickness. (3-16)				
	a) With surplus earth from foundation etc.	Cum.	1250		
	b) With new earth excavated from outside, lead upto 100ft. (30m) and lift upto 5ft. (1.5m) including royalty of Clay	Cum.	2500		
	<u>STONE SOLING OR Sub-base Matrial (Bajri)</u>				
3	Providing and laying stone pitching with hammer dressed stones on surface laid in courses including lift of 1.5 m and lead upto 30m. (19-30)				
	a) 150mm thick Compacted stone soling plinth protection	Cu.m	380		
	b) 300mm thick compacted stone soling in foundations	Cu.m	500		
	<u>TERMITE CONTROL TREATMENT</u>				
4	Spraying approved anti-termite chemical mixed with water in the ratio of 1:40	Sqm.	250		
	<u>REINFORCEMENT</u>				
5	Providing and laying reinforcement bars using hot rolled deformed billet steel bars conforming to ASTM A-615 Grade 60 having yield strength minimum 60,000 psi including the cost of straightening, cutting, bending, binding, wastage and such overlaps as are not shown over the drawings, placing in position on M.S. chairs, tying with binding wires, etc., in all kinds of RCC work complete in all respect.	ton	8		
6	Providing and laying cement concrete using approved coarse sand and crushed aggregate 3/4" (19mm) & down gauge in foundation including leveling, compacting and curing	Cu.m	185.62		
Total Amount to be carried out in Summery					

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**INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR**  
*CONSTRUCTION OF OFFICE BUILDING FOR OFF-DOCK TERMINAL*

**Provision Of Security**

S No	Description of Work	Qty:	Rate	Unit	Amount
1	Provision Of Security from a private, reputable firm or as directed by the employer	72		P Month	
Total Amount to be carried out in Summery					

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***TECHNICAL SPECIFICATIONS***

## EARTHWORKS

### 1.0 SCOPE

The work under this section of the specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with excavation, backfilling/filling for all type foundations, trenches and embankments including stock piling of suitable excavated material, disposal of unsuitable and surplus excavated material in accordance with this section of specifications, the applicable drawings and subject to terms and conditions of the Contract.

### 2.0 APPLICABLE STANDARDS

Materials, construction and testing shall comply with the following codes and standards:

- ASTM C 136 Sieve or screen analysis of fine and coarse aggregate
- ASTM D 422 Testing for Liquid and Plastic Limit of Soils
- ASTM D 596 Water Analyses
- ASTM D 1556 Density of soil in place by the sand cone method
- ASTM D 1557 Moisture-Density relation of soils.
- ASTM D 2167 Density of soil in place by the Rubber-Balloon method
- ASTM D 2216 Moisture content of soil
- ASTM D 4253 Test method for maximum Index Density and unit weight of soils
- ASTM D 4254 Test method for minimum Index Density and unit weight of soils
- ASTM D 1883 CBR-California Bearing Ratio test

### 3.0 GENERAL

- 3.1 The Contractor shall acquaint himself with the nature of the ground, existing structures and subsurface materials (soil / rock) which will be encountered during excavation or earthworks. The Employer does not guarantee or warrant in any way that the materials to be found in the excavation will be similar in nature to that of any samples which may have been exhibited or indicated in the Geo-Technical Investigation Report, Drawings or any other Contract Documents or to material obtained from boring or trial holes. The Contractor shall be deemed to have made local and independent inquiries as to, and shall take whole risk of the nature of the subsurface materials (soil / rock) to be excavated or penetrated and the Contractor shall not be entitled to receive an extra or additional payment nor to be relieved from any of his obligations by reasons of the nature of such ground and subsurface material.



- 3.2 The Contractor shall submit a detailed list of plant and equipment which he shall undertake to bring to the site and to carry out the work. The list shall satisfy the Engineer as to type, size and quantity. The Contractor shall place on the site of the work all of the equipment listed and all subsequent equipment required for approval of the detailed program of work and such equipment which may be directed by the Engineer. All equipment which is proposed to be used on the work shall be of sufficient size and in such mechanical condition as to meet requirement of work and produce a satisfactory quality of work. In no case shall the Contractor remove from the site, the plant and equipment without the written approval of the Engineer. The Contractor shall supply all plant and equipment necessary for the construction of each phase of the work and it must be on site, inspected and approved by the Engineer. If after use of the equipment the Engineer determines that the work carried out does not meet the Contract requirement, the equipment shall be changed and the deficient work shall be removed and corrected as direct by the Engineer.
- 3.3 All suitable materials from stripping of top soil and excavation shall be used unless otherwise declared unsuitable by the Engineer. The suitable material shall comply with the requirements as specified in the respective clauses for various items.
- 3.4 The Contractor shall jointly survey the area marked for service lines, buildings or other structures or any area designated by the Engineer and prepare the survey drawings showing natural ground profile and cross-section and submit to the Engineer for approval prior to start of any earthwork operation.

All suitable material from excavations shall be transported to and placed in fill areas or stockpiled at locations designated by the Engineer. Materials from excavation and stripping shall be stockpiled separately.

Existing utilities which are to remain in service or to be relocated and to remain in service until relocation are to be determined by the Contractor. They shall be safeguarded and protected from damage.

If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during the operations, shall be safe guarded, protected from damage and supported as directed by the Engineer.

- 3.5 All excavations, cut and fills shall be constructed to the lines, levels and gradients specified with any necessary allowance for consolidation, settlement and drainage so that at the end of Defects Liability Period the ground shall be at the required lines, levels and gradients. During the course of the Contract and during Defects Liability Period any damage or defects in cuts and fills, in structures and other works, caused by slips, falls of wash-ins or any other ground movement due to the Contractor's negligence shall be made good by the Contractor at his own cost.

#### 4.0 **SITE PREPARATION**

- 4.1 The Contractor shall set out the works and shall be responsible for true and perfect setting out of the same and for correctness of the positions, levels, dimensions and alignments of all parts thereof. If at any time any error in this respect shall appear during the progress of the works, the Contractor shall at his own expense rectify such error, to the satisfaction of the Engineer.



- 4.2 The Contractor shall construct and maintain accurate bench marks so that the Lines and Levels can be easily checked by the Engineer.
- 4.3 The Contractor shall construct and maintain such temporary drains in addition to those shown on the plans, as will adequately drain areas during construction.
- 4.4 The Contractor shall perform a joint survey with the Engineer's Representative, of the area where earth work is required, plot the existing ground levels on the drawings and obtain approval from the Engineer before starting the earth work and shall supply a copy to the Employer duly checked, signed and authenticated by the Engineer before start of work.

## 5.0 CLASSIFICATION OF EXCAVATION

No classification shall be made of any material excavated / cut as to its class, nature, origin or condition. The excavation will be unclassified as being carried out in all kinds of subsurface material including soil and rock.

Blasting will be permitted only when proper precautions are taken for the safety of all persons, the work, and the property. All damage done to the work or property shall be repaired at the Contractor's expense. All operations of the Contractor in connection with the transportation, storage, and use of explosives shall conform to all state and local regulations and explosive manufacturers' instructions, with applicable approved permits reviewed by the Engineer. Any approval given, however, will not relieve the Contractor of his / her responsibility in blasting operations.

In each distinct blasting area, where pertinent factors affecting blast vibrations and their effects in the area remain the same, the Contractor shall submit a blasting plan of the initial blasts to the Engineer for approval. This plan must consist of holes size, depth, spacing, burden, type of explosive, type of delay sequence, maximum amount of explosive on any one delay period, depth of rock and depth of overburden if any. The maximum explosive charge weights per delay included in the plan shall not be increased without the approval of the Engineer.

The Contractor shall keep a record of each blast fired, its date, time and location; the number of explosives used, maximum explosive charge weight per delay period, and, where necessary, seismograph records identified by instrument number and location.

The excavation wherever required will be carried out below ground water level by dewatering the area.

The Contractor shall build, maintain and operate all berms, channels, flumes, sumps and other temporary diversion and protective works needed to divert the surface water through or around the required excavation. All excavation shall be dewatered and kept free of standing water, water seeping from the sides and bottom of excavation above, the free level. The Contractor shall furnish, install, operate and maintain all drains, sumps, pumps and other equipment needed to dewater the excavation areas. Dewatering methods that cause a loss of fines from the bottom and slopes of the excavation will not be permitted.

Prior to commencement of dewatering of the required excavation, the Contractor shall furnish the Engineer for review and comments with complete plans and sketches for diverting surface water if any.



Submission for review and comments of the required plans and sketches and any approval from the Engineer shall not relieve the Contractor of any of his duties and obligations under the Contract.

## 6. FOUNDATIONS / TRENCHES

### 6.1 Excavations

- 6.1.1 Excavation shall include the removal of all material of every name and nature. Excavations shall be carried out in accordance with \_\_\_\_\_ excavation plans and sections shown on the Drawings.
- 6.1.2 The major portion of excavations shall be carried out by mechanical excavators and excavated materials disposed off to stock on spoil as per Drawings or as directed by the Engineer. The excavation, which cannot be done by mechanical means, shall be done by manual tools. Unless otherwise specified by the Engineer, leveling, trimming and finishing to the required levels and dimensions shall be done manually. The material suitable for fill and backfill if approved by the Engineer shall be stockpiled within the free haulage limit from the project boundary of the works.
- 6.1.3 The Contractor shall give reasonable notice that he intends to commence any excavation and he shall submit to the Engineer full details of his proposals. The Engineer may require modifications to be made if he considers the Contractor's proposals to be unsatisfactory and the Contractor shall give effect to such modifications but shall not be relieved of his responsibility with respect to such work.
- 6.1.4 For major excavations, the Contractor shall submit for the prior approval of the Engineer full details and drawings showing the proposed method or procedure, supporting and strutting, etc. The design, provision, construction, maintenance and removal of such temporary works shall be the responsibility of the Contractor and all cost in these respects shall be included in the quoted unit rate for the permanent work.
- 6.1.5 The Contractor's attention is drawn particularly to his obligations under the Conditions of Contract in respect of those works, which are in close proximity to existing buildings.
- 6.1.6 The Contractor shall preserve the completed excavation from damage due to slips and earth movements, ingress of water from any source whatsoever and deterioration by exposure to the sun and the effects of the weather.
- 6.1.7 All excavation of every description, in whatever material encountered shall be performed to the elevations and dimensions shown on the Drawings in such a manner as to avoid interruption to work in other parts of the site. The Contractor shall be responsible for injury to the other works caused during excavation period.
- 6.1.8 Excavation shall extend to adequate distance from walls and footings to allow for placing and removal of forms, installations of services and for inspection,



except where the concrete for walls and footings is authorized to be deposited directly against excavated surfaces. Undercutting will not be permitted.

- 6.1.9 All excavations in foundations shall be taken to 150 mm above the final excavation elevations shown on the drawings and the last 150 mm shall be trimmed carefully to a smooth and level surface. Immediately after trimming to the final elevation, a layer of blinding concrete shall be placed to the thickness shown on the drawings. All excavations for foundations which have been trimmed and disturbed shall be compacted and covered by lean concrete by the end of the day. It is specifically brought to the notice of the Contractor that any excavation taken down to the trimmed elevation which is left over-night or for any length of time thereafter, uncovered by the blinding concrete, shall be required to be trimmed to such lower elevation as directed by the Engineer and any extra work or any consequent increase in the quantities caused thereby shall not be paid to the Contractor.
- 6.1.10 No excavation shall be covered nor any permanent work commenced until the foundation has been inspected by the Engineer and his permission to proceed is given.
- 6.1.11 If excavation for sub-structures are carried below the required level, as shown on the Drawings or as directed by the Engineer, the surplus depth shall be filled in with concrete of same grade as of blinding concrete at the sole cost of the Contractor.
- 6.1.12 All excavation shall be performed in the dry. The placing of blinding concrete, placing of reinforcement and casting of the permanent works in the excavation shall be carried out in the dry and the Contractor shall have sufficient dewatering equipment for this purpose. The Contractor shall design, provide and maintain effective dewatering system during excavation and construction of foundations up to plinth level so as to keep the foundation area dry. Adequate precautions shall be taken to prevent any erosion due to undercutting from underneath the previously constructed adjoining foundations.
- 6.1.13 Shoring, where required during excavation, shall be installed to protect workmen and the bank, adjacent paving, structures and utilities. The term shoring shall also be deemed to cover whatever methods the Contractor elects to adopt, with prior approval of Engineer, for upholding the sides of excavation and also for planking and strutting to excavation against the side of roadways and adjoining properties in existing hardcore of any other material. The Contractor will be held responsible for upholding the sides of all excavations and no claim for additional excavation, concrete or other material will be considered in this respect.
- 6.1.14 Existing utility lines that are shown on the drawings or the locations of which are made known to the Contractor prior to excavation and that are to be retained, as well as utility lines constructed during excavation and backfilling, and if damaged, shall be repaired by the Contractor at his own expense. Any existing utility lines which are not known to the Contractor in sufficient time to avoid damage, if inadvertently damaged during excavation, shall be repaired by the Contractor and adjustment in payment will be made as approved by



the Engineer. When utility lines which are to be removed, are encountered within the area of operations the Contractor shall notify the Engineer in ample time for the necessary measures to be taken to prevent interruption of the service.

- 6.1.15 Excavated material suitable for use as fill and backfill shall be stockpiled within free haulage limit from the project boundary as directed by the Engineer. This stockpiled material shall be transported back to places requiring fill or backfill.
- 6.1.16 Excavated material unsuitable for use as fill and backfill shall be disposed off by the Contractor at locations approved by the Engineer within specified free haulage limit.
- 6.1.17 Where applicable the excavation work shall include the excavation in above water table and excavation below water table. The Contractor shall submit the proposal for dewatering from the areas of excavation for the approval of the Engineer and shall provide all plant, equipment, pumps, sheeting, well points as required to keep the water table 1.0 metre below the deepest foundation as shown on the drawings till the completion of foundation works.
- 6.1.18 The Contractor shall make independent enquiries and perform and make independent observations to ascertain the water table in the areas of excavations during the period when the construction works are in progress. The Contractor shall take whole risk of any nature for fluctuation of the water table from his own findings. The Employer/Engineer does not bind himself in any way and shall not be responsible for any information given by him or any information, observations or values obtained from his reports, Drawings, and Documents or anywhere in this Document.

## 6.2 EMBANKMENT CONSTRUCTION

### 6.2.1 General

It shall consist of construction of select embankment for paved areas and common embankment for unpaved, areas. Only approved material shall be used in the construction of embankments.

All embankment construction shall be made to the lines, levels, profiles and grades as shown on the drawings or established by the Engineer. During progress of the work, it may be found necessary or desirable by the Engineer to vary the levels, elevations and grades from those shown on the drawings. The Contractor shall perform the embankment construction to the revised levels, elevation as established by the Engineer.

Where embankments are to be placed in water logged areas and which are inaccessible to heavy construction equipment, a working platform shall be first established, consisting of a blanket of fill material placed on the water-logged area. The thickness of the working platform shall be about 0.5 metre unless directed otherwise by the Engineer and the width shall be that of the embankment. The placement and compaction of the working platform shall

be performed by use of light equipment as directed by the Engineer. No density requirements are specified for the working platform; however, subsequent layers above shall be compacted to densities specified in the relevant items.

Benching of sufficient width for slope stability and movement of equipment and machinery shall be carried out for embankment formation in areas of steep slopes.

### 6.2.2 Select Embankment

The select embankment shall be constructed under all paved areas. The area shall be prepared (after stripping of top soil) by scarifying the surface to a minimum depth of 150 mm and compacting it to required densities.

#### 6.2.2.1 Material

The suitable subsurface material obtained from excavation (except stripping of top soil) shall be used in the construction of select embankment. The material shall be A-4 or superior as per AASHTO soil classification. The soaked CBR of the material shall be equal to or greater than 6. In the top 30 cm the material shall be A-4 or superior and the  $PI \leq 8$ . When excavated material consists predominately of rock fragments of such size that the material cannot be placed in layers of the prescribed thickness without crushing, pulverizing or further breaking down the pieces, such material may be placed in layers not exceeding 60 cm in thickness. Each layer shall be leveled and smoothed with suitable leveling equipment and by distribution of spalls and finer fragments of rock. These type lifts shall not be constructed above an elevation (150 cm) below the finished sub-grade.

#### 6.2.2.2 Formation of Embankment

Embankment shall be formed in successive horizontal layers of not more than (200 mm) in loose depth for the full width of the cross-section, unless otherwise approved by the Engineer.

The material placed in layers and the sub-grade scarified shall be compacted to the density specified below:

Depth (cm) Below Subgrade Level		Percent of Max. dry Density as per ASTM D1557	
Cohesive Soil	Non-Cohesive Soil	Cohesive Soil	Non-Cohesive Soil
0 to 30	0 to 60	95%	100%
30 to 75	60 to 100	93%	95%
Over 75	Over 100	90%	90%

Sub-grade level is the surface on which the pavement structure will be placed.

The maximum density of sand (granular) material (if used) shall also be determined as per ASTM D4253. The higher of the two values obtained from ASTM D1557 and ASTM D4253 shall be used to check the relative compaction of the in-place material.



The moisture content of the material should be controlled to within  $\pm 2\%$  of the optimum moisture content. In order to achieve a uniform moisture content throughout, the wetting and drying of the material, and manipulation shall be required when deemed necessary. Also, the California Bearing Ratio test (ASTM D1883) may be conducted on soil if instructed by the Engineer.

The embankment formed by rock fragments of such size that the material can not be placed in layers of thickness prescribed without crushing, pulverizing or further breaking down the pieces, such material may be placed in layers not exceeding 60 cm of loose measurement and compacted by vibratory roller with mass as specified hereunder:

Mass per metre width of Vibratory roll (kg/m)	Depth of fill layer cm	Number of passes of the roller on each layer
2300 – 2900	40	5
2900 – 3600	50	5
3600 – 4300	60	5

The material shall be carefully placed in layer so that all larger stones will be well distributed and voids completely filled with smaller stones, small spall and soil to form a solid mass. After placing the rock material, surface shall be covered with fine material having thickness less than 20 cm.

Material for each layer should be consolidated with heavy weight vibratory roller until settlement as checked between two consecutive passes of roller is less than 1% of the layer thickness. When rock to be incorporated in fill is composed largely of weak or friable material, the rock shall be reduced to a maximum size not exceeding 50% of the thickness of the layer being placed.

### 6.2.3 Common Embankment

#### 6.2.3.1 Material

The area requiring common embankment, i.e. graded strip, and other unpaved areas shall be constructed from the excavated soil and rock. The top soil obtained from stripping may be used at deeper level with the approval of the Engineer.

#### 6.2.3.2 Formation of Embankment

Before placing and compacting the fill material the ground shall be scarified to a depth of 15 cm and compacted to a dry density of 90% as per laboratory compaction test method ASTM D1557. The moisture content of soil during compaction of scarified layer and successive layers shall be within  $\pm 2\%$  of optimum moisture content before rolling to obtain the desired density results. The successive horizontal layers shall be formed in loose depth (200mm) for the full width of the cross section unless otherwise approved by the Engineer. Each layer will be compacted to dry density of 90% as per laboratory compaction test method ASTM D 1557.



The layer thicknesses and compaction requirements shall be the same as specified under 'Select Embankment' for embankment formed by rock fragments.

No rock larger than 8 cm in any dimension shall be placed in top thirty (30 cm) of embankment unless allowed by the Engineer.

#### 6.2.4 Tolerances

Select Embankment

The grade surface of each layer excluding final layer, shall be smooth and even and tolerance from required grade shall not be more than 20 mm.

Common Embankment

The grade surface of each layer including the final layer, shall be smooth and even and tolerance from required grade shall not be more than 20 mm.

### 6.3 **Fill and Backfill**

6.3.1 After completion of foundations, walls, trenches and other construction below the elevation of the final grades and prior to start of back filling, forms shall be removed and the excavation shall be cleaned of trash and debris.

6.3.2 The backfilling shall include filling under the floors, around the foundation and in trenches.

6.3.3 The backfilling shall include loading, unloading, transporting, placing, stacking, spreading of earth, watering, rolling, ramming and compacting, etc., complete as specified herein.

6.3.4 Filling under floor/trenches shall be done with approved selected material obtained from required excavation or outside sources. It shall be predominantly granular material and free from slurry mud, organic or other unsuitable matter and capable of compaction by ordinary means.

6.3.5 The Contractor shall provide the approved quality of backfill and fill material required to complete the fill and backfill from the places designated by the Engineer.

6.3.6 Filling in foundations/trenches shall be placed in 200 mm layers and compacted at optimum moisture content by mechanical means or other means as approved by the Engineer.

6.3.7 Material for backfilling shall be as approved by the Engineer and shall be placed in layers not exceeding 200 mm measured as compacted material and saturated with sufficient water and compacted to produce in-situ density not less than 95% of the maximum dry density at optimum moisture content, achieved.

6.3.8 All fill areas shall be left neat, smooth and well compacted, the top surface consisting of the normal site surface soil, unless otherwise directed.



- 6.3.9 Depending on the capacity of the compacting equipment the Engineer may instruct increased thickness of successive layers to be placed.
- 6.3.10 Fill shall not be placed against foundation walls prior to approval by the Engineer. Fill 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.
- 6.3.11 In case the Contractor has to arrange the fill material from outside source the quality of the fill material will be subject to the approval of the Engineer. The Engineer shall require the Contractor to carry out various tests of the fill material. All such tests shall be made at an approved laboratory at the cost of the Contractor.
- 6.3.12 Backfilling of foundations / trenches shall be carried out only after the structural works within the excavations have been inspected, tested and approved by the Engineer.
- 6.3.13 Layers upto an elevation of 300 mm above the top of the bedding shall not be more than 150 mm in loose thickness and the remainder of the layers above that elevation shall not be more than 150 mm of compacted thickness.
- 6.3.14 If it is found necessary to alter the moisture content of the fill material in any way, then, very strict control shall be exercised over the wetting and/or the drying process and frequent moisture content tests shall be carried out.
- 6.3.15 The stabilization of compacted fill/backfill surfaces shall be smooth and even and shall not vary more than 10mm in 3 meters from true profile and shall not be more than 12.5mm from true elevation.

## 7.0 QUALITY CONTROL

A testing program shall be submitted by the Contractor. Tests shall be performed by the Contractor to ensure compliance with the specifications as required. A copy of all test reports shall be submitted to the Engineer for approval. The test shall be performed in accordance with the following test procedures and frequency of testing.

Prior to construction of embankment, classification and compaction tests shall be carried out on stock-piled material obtained from stripping of top soil and excavated subsurface material (soil & rock). The tests shall be carried out as per ASTM 422, ASTM 424 and ASTM D 1557. A family of laboratory compaction curves as per ASTM D 1557 representing typical material shall be developed for the fill / backfill material.

The frequency of classification tests shall be for every 1000 cu.m of fill material. The Engineer may alter the frequency of testing depending on the type of material and variation encountered at site.

The field density tests shall be performed as per ASTM D 1556 or ASTM D 2167. The frequency of testing shall be as under:

### Select Embankment

Area requiring 90% to 93% compaction – one test in every 500 m<sup>2</sup> area in each layer

Area requiring 95% & 100% compaction – one test in every 300 m<sup>2</sup> area in each layer



## Common Embankment

Area requiring 90% compaction – one test in every 1000 m<sup>2</sup> area

The average of four tests is required to be greater than the required compaction and not more than one test be 1.8% less than required percentage of compaction. This is for 100% compaction. For 95% to 90% compaction the following is required.

<u>%age Compaction</u>	<u>One test not less than</u>
95%	93.5%
90%	89.5%

## 8.0 DISPOSAL OF SURPLUS EXCAVATED MATERIAL

- 8.1 The rejected unsuitable material and surplus excavated material shall be disposed of within 5-kilometer lead measured along the most direct route from boundary of the Project, as shown on the Drawings or as directed by the Engineer.
- 8.2 The disposal of surplus/unsuitable excavated material shall include loading, unloading, transporting, stacking, spreading and leveling as directed by the Engineer.

## 9.0 SAND BEDDING/CRUSH AGGREGATE BEDDING

- 9.1 The sources of supply of all fine and coarse aggregates shall be subject to the approval of the Engineer.
- 9.2 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.
- 9.3 Sulphate content of aggregates shall not exceed 0.40 percent by weight for each individual source of course and fine aggregate. Chloride content of aggregates shall not exceed 0.05 percent by weight for each source of course and fine aggregate.
- 9.4 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.
- 9.5 Coarse aggregate shall be gravel or crush stone of hard, durable material free from laminated structure and conforming to PS 243 and/or BS 882 and/or ASTM C-33.

## 10. MEASUREMENT AND PAYMENT

### 10.1 General

Except otherwise specified herein or elsewhere in the Contract Documents no measurement and payment will be made for the under mentioned items related to this section. The cost thereof shall be deemed to have been included in the quoted unit rate of the items of the Bill of Quantities under this section.

10.1.1 De-watering where required to keep the foundations and services line trenches dry during construction of Works.



- 10.1.2 Timber shoring, planking, strutting and providing slope for upholding the sides of excavations.
- 10.1.3 Any fill with approved material necessitated by over excavation due to fault or convenience of the Contractor.
- 10.1.4 Stockpiling the excavated material at approved location within free haulage limit from the Project Boundary and transporting back suitable material to places requiring fill or backfill.
- 10.1.5 Foundation bed preparation for service line trenches and building.
- 10.1.6 Extra excavation involved in providing adequate working space around sides of foundation and service line trenches.
- 10.1.7 Scarifying, rolling, leveling, watering and compacting the fill and backfill to required density.
- 10.1.8 All laboratory and field tests stipulated in these specifications.
- 10.1.9 Disposal of rejected surplus and unsuitable excavated material within 5 kilometers free haulage limit measured along the most direct route from boundary of the Project.

## 10.2 **Excavation for Foundations/Trenches**

### 10.2.1 Measurement

The quantities set out for excavation and its subsequent disposal shall be deemed to be the bulk quantity before excavating and no allowance shall be made for any subsequent variations in bulk or for any extra excavation.

Unless otherwise shown on the Drawings quantities of excavation shall be measured of acceptably completed works on the basis of vertical excavation lines required for the nominal concrete dimensions of the structural members of foundations.

Measurement of acceptably completed works of excavation will be made on the basis of number of cubic feet of material excavated for foundation, pipeline trenches as shown on the drawing. It shall be calculated/ measured from pre-work levels and the levels shown on the drawing.

### 10.2.2 Payment

Payment will be made for acceptable measured quantity of excavation on the basis of unit rate per cubic feet quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## 10.3 **Backfill/Fills**

### 10.3.1 Measurement

Measurement of acceptably completed works of backfill/fill works will be made on the basis of number of cubic feet of compacted backfill/fill in



position in accordance with the lines, levels and grade as shown on Drawings.

#### 10.3.2 Payment

Payment will be made for acceptable measured quantity of backfill/fill on the basis of unit rate per cubic feet quoted in the Bills of Quantities and shall constitute full compensation for all the work related to the item.

### 10.4 **Sand bedding /Crush aggregate bedding**

#### 10.4.1 Measurement

Measurement of acceptably completed works of sand bedding /crush aggregate bedding will be made on the basis of number of cubic feet of compacted sand bedding /crush aggregate bedding provided and compacted in position in accordance with the lines, levels and grade as shown on Drawings.

#### 10.4.2 Payment

Payment will be made for acceptable measured quantity of sand bedding /crush aggregate bedding on the basis of unit rate per cubic feet quoted in the Bills of Quantities and shall constitute full compensation for all the work related to the item.

### 10.5 **Sweet Earth Fill**

#### 10.5.1 Measurement

Measurement of acceptably completed works of sweet earth fill will be made on the basis of number of cubic feet of sweet earth fill provided and filled in position in accordance with the lines, levels and grade as shown on Drawings.

#### 10.5.2 Payment

Payment will be made for acceptable measured quantity of sweet earth fill on the basis of unit rate per cubic feet quoted in the Bills of Quantities and shall constitute full compensation for all the work related to the item.



## REINFORCEMENT

### 1.0 SCOPE

The work under this section of specification consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in connection with the supply, transporting, cutting, bending and placing steel reinforcement, welded wire-fabric, dowels, tie-bars and assemblies in concrete structures, pavement or elsewhere, as shown in the drawings, as specified herein and as required by the site conditions or as directed by the Engineer.

### 2.0 APPLICABLE STANDARDS

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

#### Pakistan Standard

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

#### British Standard

B.S 4449	Carbon steel bars for reinforcement of concrete
B.S 8666	Specifications for Bending dimensions and scheduling of bars for the reinforcement of concrete.

#### ASTM Standard

A 185	Standard specification for welded steel wire fabric for concrete reinforcement.
A305	Minimum Requirement for deformations of Deformed Steel Bars for Concrete reinforcement
A 615	Standard specification for deformed and plain billet steel bars for concrete reinforcement.

#### ACI Codes

ACI 315	Details and Detailing of Concrete Reinforcement (ACI Publication SP-66)
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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.

### 3.0 MATERIALS

#### 3.1 Reinforcement

##### 3.1.1 General

Reinforcement shall be obtained only from manufacturers approved by the Engineer. Each consignment of reinforcement steel shall be accompanied by the manufacturer's certificate or shall refer to a previous certificate, if the consignment is from the same batch, showing that the reinforcement steel complies with the specified requirement. If such certificate is not made available, the Engineer may direct testing of different consignments of reinforcing steel at the Contractor's cost. Should the result of such tests show that the sample does not meet with the specifications the whole consignment shall be rejected and removed from the site at the Contractor's cost.

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

##### 3.1.2 Reinforcing Steel

Unless otherwise specified, all reinforcing bars shall comply with the requirements of ASTM A-615 for deformed and plain carbon steel bars hot rolled from new stock billet steel bars and shall have minimum yield strengths of 60,000 psi (420 MPa) and 40000 psi (280 MPa) respectively.

##### 3.1.3 Spacers and Supports

Spacers and supports shall be approved standard products of types best suited for the purpose.

##### 3.1.4 Welding

The bars shall not be welded, unless prior approval of the Engineer is obtained in writing. If permitted, welding shall be done in accordance with the latest addition of AWS D 1.4 with proper section of procedure and filled material according to the chemical composition of the bars being welded together.

### 4.0 COMPLIANCE WITH SPECIFICATIONS



The Contractor shall submit the document stating that the supplied reinforcement conforms to the Specifications. In addition, wherever and as directed by the Engineer, conformance of the supplied reinforcing bars with the specifications shall be demonstrated by the Contractor through laboratory tests, in accordance with the relevant standards.

## 5.0 DELIVERY & STORAGE

### 5.1 Delivery

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

### 5.2 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.

## 6.0 BAR BENDING SCHEDULES

The Contractor shall prepare bar bending schedules of all the reinforcing steel bars and shall obtain approval of the Engineer before proceeding with the work.

The Engineer's approval, however, will not relieve the Contractor of his responsibility in this regard.

## 7.0 FABRICATING, BENDING & PLACING

7.1 Reinforcement shall be accurately placed as shown in drawings and secured against displacement by using 16-gauge steel wire ties or suitable clips at intersections and supported from the formwork by using concrete, metal or plastic chains, 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 one part of cement to two 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.

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

7.3 The cutting tolerance for all reinforcing bars shall be 20 mm.



- 7.4 Fabricating tolerance shall be as per ACI - 315.
- 7.5 Placing tolerances shall be as per ACI-318 & 317.
- 7.6 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 the Engineer.
- 7.7 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 columns dowels.
- 7.8 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 the Engineer, reinforcement shall not be bent after being partially embedded in hardened concrete.
- 7.9 No splice of reinforcement shall be made except as approved by the Engineer.
- 7.10 Welding of reinforcement shall not be done unless permitted and approved by the Engineer.
- 7.11 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.
- 7.12 No concreting is to be carried out until the reinforcement has been checked and approved by the Engineer.
- 7.13 All detailing shall be done as per ACI standards ACI-315, ACI-318 & ACI-350R, as and where required.
- 7.14 Standard or actual unit weight whichever is lesser shall be used for calculation of weights.

## 8.0 MEASUREMENT & PAYMENT

### 8.1 General

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



8.1.1 Providing and installing chairs, supports, hooks, spacers, binding wires, corrosion protection sleeves, wire cage or basket for tie bars and dowels and laps not shown on drawings including wastage and rolling margin.

8.1.2 Testing of mild steel, deformed steel, welded wire fabric, dowels, tie bars and assemblies.

## 8.2 Reinforcing Bars.

### 8.2.1 Measurement

Measurement for acceptably completed works of reinforcement shall be made by weight in metric ton according to bar bending schedules approved by the Engineer.

### 8.2.2 Payment

Payment will be made for acceptable measured quantity of reinforcement provided and placed in position on the basis of unit rate per metric ton quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## PLAIN AND REINFORCED CONCRETE

### 1.0 SCOPE

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, manufacture, transporting, placing, consolidating, finishing and curing of plain and reinforced concrete for pavements and other structures as shown in the drawings, as specified herein and as required by the site conditions or as directed by the Engineer, for a complete job. Reinforcement does not form part of this section.

### 2.0 GENERAL

#### APPLICABLE CODES AND STANDARDS

The latest edition of following ACI, ASTM, Pakistan & British Standard are relevant to these specifications wherever applicable:

#### 2.1 ACI (American Concrete Institute)

- 117 Standard Specification for tolerances for concrete construction and materials.

- 201.2 Guide to durable concrete



- 211.1 Recommended Practice for Selecting Proportions for Normal and Heavy Weight Concrete.
- 214 Recommended Practice for Evaluation of Strength Test Results of Concrete.
- 301 Specifications for Structural Concrete for Buildings
- 303.1 Standard Specification for Cast Iron Plate, Architectural Concrete
- 304R Guide 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 for Detailing Reinforced Concrete Structures.
- 351.1R Grouting for Support of Equipment & Machinery.
- 318 Building Code Requirements for Reinforced Concrete
- 347 Recommended Practice for Concrete Formwork
- 350R Concrete Sanitary Engineering Structures
- 544.1R State-of-the-Art Report on Fiber Reinforced Concrete
- 544.2R Measurement of Properties of Fiber Reinforced Concrete
- SP-2 Manual of Concrete Inspection
- SP-142 Fiber Reinforced Concrete Developments and Innovation
- SP-155 Testing of Fiber Reinforced Concrete
- SP-182 Structural Applications of Fiber Reinforced Concrete

## 2.2 ASTM (American Society for Testing and Materials)

- C 31 Making and Curing Concrete Test Specimens in the Field
- C 33 Concrete Aggregates
- C 39 Compressive Strength of Cylindrical Concrete Specimens
- C 40 Organic impurities in sand for concrete.
- C 42 Obtaining and Testing Drilled Cores and Sawed Beams of Concrete



- C 78 Flexural Strength of Concrete (Using Simple Beam with Third Point Loading)
- 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 Materials Finer than No.200 Sieve in Mineral Aggregates by washing.
- C 123 Light weight pieces in aggregates
- C 125 Concrete and Concrete Aggregates
- C 127 Test method for Specific Gravity and Absorption of Coarse Aggregate
- C 128 Test method for Specific Gravity and Absorption of Fine Aggregate
- C 131 Resistance to Degradation of small size Aggregate by Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine
- C 136 Sieve or Screen Analysis of Fine and Coarse Aggregates
- C 138 Unit Weight, Yield, and Air Content (Gravimetric) of Concrete
- C 142 Clay Lumps and Friable Particles in Aggregates
- C 143 Slump of Portland Cement Concrete
- C 144 Aggregate for Masonry Mortar
- C 150 Portland Cement
- C 156 Test Method for Water Retention of Concrete Curing Materials
- C 157 Length Change of Hardened Hydraulic Cement Mortar or Concrete
- C 171 Sheet Materials for Curing Concrete
- C 172 Method of Sampling Fresh Mixed Concrete
- C 173 Air Content of Freshly Mixed Concrete by the Volumetric Method
- C 185 Air Content of Hydraulic Cement Mortar
- C 186 Heat of Hydration of Hydraulic Cement



- C 188 Density of Hydraulic Cement
- C 191 Time of Setting of Hydraulic Cement by Vicat Needle
- C 217 Weather resistance of Natural State
- C 227 Potential Alkali Reactivity of cement - Aggregate Combination.
- C 231 Air Content of Freshly Mixed Concrete by the Pressure Method
- C 260 Air-Entraining Admixtures for Concrete
- C 289 Potential reactivity of Aggregate
- C 293 Standard test method for Flexural Strength of Concrete (using simple beam with center Point Loading)
- C 309 Liquid Membrane-Forming Compounds for Curing Concrete
- C 321 Standard Test method for Bond Strength of Chemical Resistant material
- C 330 Light Aggregates for Structural Concrete
- C 332 Light weight aggregates for insulating concrete.
- C 348 Standard Test method for Flexural strength of Hydraulic Cement Mortars
- C 400 Requirements for water use in mixing and curing concrete
- C 494 Chemical Admixtures for Concrete
- C 535 Resistance to Abrasion of Large Size Coarse Aggregates
- C 595 Specification for Blended Hydraulic Cements
- C 596 Standard Test method for Drying, shrinkage of Mortar Containing Hydraulic Cement
- C 685 Concrete Made by Volumetric Batching and Continuous Mixing
- C 881 Epoxy-Resin-Base Bonding Systems for Concrete
- C 989 Ground Granulated Blast – Furnace Slag for use in Concrete
- C 995 Standard Test Method for Time of Flow of Fiber Reinforced Concrete Through Inverted Slump Cone



- C 1018 Standard Test Method for Flexural Toughness and First- Crack Strength of Fiber-Reinforced Concrete (Using Beam with Third-Point Loading)
- C1116 Standard specification for Fiber-Reinforced Concrete and Shotcrete)
- C 1399 Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete
- D 75 Sampling Aggregates
- D 512 Chloride Ion in Water and Waste Water
- D 516 Sulphate Ion in Water and Waste Water
- D 596 Reporting Results of Analysis of Water
- D 1190 Concrete Joint Sealer, Hot-Poured Elastic Type
- D 1411 Water-Soluble Chlorides Present as Admixes in Graded Aggregate Road Mixes
- D 1751 Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (No extruding and Resilient Bituminous Types)
- D 1752 Preformed sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Concrete
- D 1850 Concrete joint sealer (cold application type)
- E 11 Wire-Cloth Sieves for Testing Purposes
- E 96 Water Vapour Transmission of Materials in Sheet Form
- E 154 Materials for Use as Vapour Barriers under Concrete Slab
- E 337 Relative Humidity by Wet and Dry Bulk Psychrometer
- CALIF 217 Method of Test for Sand Equivalent
- CALIF 227 Method of Test for Evaluating Cleanness of Coarse Aggregate

### 2.3 CRD US Army Corps of Engineers

- CE CRD C 119 Method of Test for Flat and Elongated Particles in Coarse Aggregate
- CE CRD C400 Requirements for Water for Use in Mixing and Curing Concrete
- CE CRD C 513 Rubber Water stops



- CE CRD C 572 Polyvinyl Chloride Water stops
- CE CRD C 589 Standard Specification for latex agent for bending fresh to Hardened concrete.
- FF MM G 650 Epoxy-Resin Grout

## 2.4 B.S (British Standard)

BS EN 197-1 Cement composition, Specification and Conformity criteria replaced by BSN EN 197-1 2000

- 12 Portland cement (Ordinary & Rapid Hardening)
- 146 Portland Blast Furnace Slag Cement
- 410 Test Sieves
- 812 Methods for the sampling and testing of mineral aggregates, sand fillers.
- 882 Specification for aggregates from natural sources for concrete (replaced by EN but remains current).
- 1305 Specification for Batch Mixer.
- 1881 Methods of Testing Concrete
- 3148 Methods of Test for water for making concrete remain current but replaced by BS EN 1008 : 2002
- 4027 Specification for Sulphate Resistant Portland Cement
- 8110 Structural use of concrete.

In addition, the latest editions of other Pakistan Standard, ACI, ASTM & British Standard and other Standards as may be specified by the Engineer for Special Materials and construction are also relevant.

## 3.0 SUBMITTALS

All submittals shall be in accordance with the schedule of submittals prepared by the Contractor and approved by the Engineer.

### 3.1 Proposed Mix Designs



Submit proposed designs for trial design batches for each grade of concrete along with samples of proposed material.

Submit proposed final mix designs for each grade of concrete at least 7 calendar days before the date planned for the start of concrete placement, along with samples of proposed materials which differ from those submitted previously, and reports of successful 3, 7 and 28 calendar day strength tests, for Engineer's approval.

### 3.2 Construction Procedure

Submit to the Engineer procedures for the following:

- a) Both hot and cold weather concreting procedures shall be submitted to the Engineer by Contractor regardless of the need for the immediate implementation of such not less than two weeks before beginning the work. Procedures shall include requirements for insulation, enclosures and the like. Finishing procedures and timing and duration of curing shall be described.
- b) Contractor's construction procedures shall be computer word processed procedure and shall include charts and diagrams as applicable and necessary, to fully explain the subject procedures, methods and equipment operation in order to allow effective review by the Engineer, assist the Testing Agency's evaluation of the work, and to allow Contractor's personnel to perform work in full conformance to the Tender & Contract Document.
- c) Protection of concrete against injury due to mechanical contact and construction operation.
- d) Protection of work by other trades.

### 3.3 Placement Schedule

Submit a placement schedule for approval prior to start of concrete placement operations. Daily concrete pour schedules shall be submitted 24 hours in advance of planned pours.

### 3.4 Formwork

Submit for approval copies of manufacturer's data and installation instructions for proprietary materials including form coatings, manufactured form systems, ties and accessories.

### 3.5 Certificates of Compliance

Submit certificates of compliance covering cement types, reinforcement, grout materials, additives, epoxy-resin materials etc. The certificates of compliance shall include the material or product manufacturer's statements that supplied items conform to Specifications.



### 3.6 Testing Programme

Submit test programme for all specified requirements along with the testing schedule for approval of the Engineer.

### 3.7 Test Reports

Submit test reports showing the result of required tests and compliance with specified standards and codes, for approval. Test reports shall be certified by the Contractor and the Testing Agency.

### 3.8 Samples

Submit to the Engineer for acceptance prior to purchase, fabrication or delivery, samples of materials for his approval.

Substitute products or materials proposed by the Contractor shall be submitted as samples for approval. The samples shall be accompanied by detailed information about materials.

### 3.9 Shop Drawings

Shop drawings shall be submitted to the Engineer for approval in accordance with the requirements of the Contract Documents and as specified herein under:

- a) Shop drawings furnished for this section shall conform to the best standards of the construction industry. Shop drawings shall be prepared under the supervision of competent engineering personnel. Prior to submittal, the Contractor shall check each shop drawing for compliance with the requirements of the Contract Documents. As evidence of conformance with this requirement, each shop drawing shall bear the seal and the self-written signature of Contractor's registered Professional Engineer.
- b) Shop drawings shall include plans, elevations, sections and complete details to describe clearly, at an ample scale for all works to be provided. Drawings shall be accurately dimensioned, where applicable, and shall be noted clearly.
- c) Work of Other Trades: Show in the shop drawings, and dimension thereon, holes required for passage of work of other sections through Cast-In-Place Concrete Work. Prepare and submit to the Engineer field work drawings for holes not shown in shop drawings.
- d) Submit shop drawings for curved and radial concrete formwork and identify the formwork materials proposed for use.
- e) Construction Joint, Expansion Joint and contraction Joint Drawings: Show all joints given in the drawings, specified herein, and required by Contractor to provide for the sequence of pourings. Submit in sufficient time to allow the orderly detailing of reinforcing steel. Reinforcement shop drawings shall be prepared in conformance with the accepted Construction Joint, Expansion Joint and contraction Joint Drawings. Measures to control

cracks e.g. shrinkage strips, admixture as per relevant ACI codes shall be shown on the drawings.

- f) Reinforcing Steel, including welded wire fabric (WWF), shall be detailed in strict accordance with the methods and procedures provided in "ACI Detailing Manual". Reinforcing steel drawings shall be submitted simultaneously with related shop drawings.

Prepare shop drawings which provide for reinforcement, including dowels, properly positioned in all concrete work, so that material can be properly cut, bent and placed. Form not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully given in shop drawings. Reinforcing steel drawings shall show, to scale, all concrete work including pits, kerbs, trenches, pads, equipment bases, steps, slopes, curves, openings, holes, blockouts and the like. Provide schedules and details showing placing sequences, bending, lengths and locations of all reinforcement.

- h) Detailing: All reinforcing steel shall be detailed in strict compliance with ACI 318 and ACI 315.

### 3.10 Coordination Drawings

Submit coordinated drawings of the following:

All sleeve locations, whether round or of other shape, penetrating exterior and interior walls, pits, slabs, beams, other structural systems and pavements.

The position of all embedded items required to receive the work of other trade, including details needed to assure correct placement of both the embedded items and the reinforcing steel.

The Contractor shall coordinate and crosscheck for accuracy, completeness and correct relationship to the work of other sections, each shop drawing prepared for the work of this section, including each shop drawing prepared by nominated subcontractors. Contractor's check shall include a verification of strict compliance with the Contract Documents and shall be performed prior to submission of each shop drawing for review by the Engineer. The Contractor shall certify the coordination, accuracy, and Contract compliance of each shop drawing by a written statement placed in each drawing and attested by the responsible person in charge of the work for Contractor. The personally inscribed initials of the person(s) preparing each drawing as well as the detailing agency's supervisor and chief checker shall be included in the title block or similar prominent location.

### 3.11 Mill Test

Furnish the Engineer with certified mill test report for cement and for steel reinforcement, including bars, welded wire fabric, dowels, anchors and splices for approval.

### 3.12 Name of Manufacturers/Suppliers



Submit for acceptance by the Engineer:

- Aggregates
- Ready mix concrete
- Reinforcing bars
- Welded steel wire fabric
- Concrete accessories
- Cement
- Admixture
- Joint filler
- Joint sealants
- Water stops
- Membrane curing, sealing, hardening compound
- Bonding compound
- Form oil
- Anchors

## 4.0 MATERIALS

### 4.1 Cement

4.1.1 The cement shall be fresh and of approved origin and manufacturer. It shall be one of the following as may be specified by the Engineer.

- Sulphate Resistant Portland Cement (low alkali) complying with the requirements of BS-4027 or ASTM C-150 Type V.
- Ordinary Portland Cement Type II (low alkali) complying with the requirements of BS-12 or ASTM C-150.
- Portland Blast–Furnace Slag Cement shall conform to BS-146 or to ASTM C-595. Slag shall consist of finely ground granulated iron blast–furnace slag and shall conform to ASTM C-989 Grade 80, 100, or 120.
- The proportioning of OPC and Portland Blast Furnace Slag material shall be in the ratio of 60 OPC to 40 Slag or as approved by the Engineer.”

4.1.2 Unless otherwise specified, ordinary Portland Cement complying with the requirements of ASTM C150 Type 1 shall be used.

4.1.3 The Contractor shall supply to the Engineer at fortnightly intervals, reports of tests for conformance with the relevant specified 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.

4.1.4 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.



- 4.1.5 There shall be sufficient cement at site to ensure that each section of work is completed without interruption.
- 4.1.6 Cement reclaimed from cleaning of bags or from leaky containers shall not be used.
- 4.1.7 The Contractor shall provide and erect (at his cost) in a suitable plain, dry, well ventilated, weather-proof and water proof shed of sufficient capacity to store the cement.
- 4.1.8 The cement shall be used as soon as possible after delivery and cement which the Engineer consider 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.
- 4.1.9 Mixing together of different types of cement shall not be permitted.

## 4.2 **Aggregates**

- 4.2.1 The sources of supply of all fine and coarse aggregates shall be subject to the approval of the Engineer.

Aggregates shall conform to ASTM C33 (including applicable ASTM Documents referenced therein) and as specified. Coarse aggregates shall be well graded from fine to coarse within the prescribed limits of this specification. Fine aggregate shall consist of natural sand, manufactured sand or combination of the two and shall be composed of clean, hard, and durable spherical or cubical particles. Coarse aggregate shall consist of crushed or uncrushed gravel, crushed stone, or a combination thereof and shall be clean, hard, uncoated particles of maximum nominal size as specified for each grade of concrete.

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. The materials shall be stock piled for a period before use for at least a day so as to drain nearly to constant moisture content. The grading of the coarse and fine aggregates shall be tested at least once for every 100tons supplied, to ensure that grading is uniform and same as that of the samples used in preliminary tests.

The sulphate content of aggregates shall not exceed 0.40 percent by weight for each individual source of coarse and fine aggregate. The chloride content of aggregates shall not exceed 0.05 percent by weight for each source of coarse and fine aggregate. The total sulphate content of

concrete shall not exceed 4.0 percent by weight of the cement. The total chloride content of concrete shall not exceed 0.40 percent by weight of the cement.

Aggregates, when tested in accordance with CRD C119 shall contain not more than 8 percent by weight of thin, flat and elongated particles.

Petrographic analysis of aggregate shall be carried out initially for each source and periodically whenever directed by the Engineer.

The specific gravities and absorption of aggregates shall be identified in accordance with ASTM C 127 and ASTM C 128.

Prior to the initial use of each source of aggregates, certified tests shall be performed on aggregates to verify compliance with these specifications and submitted for Engineer's review and approval.

Gradation of coarse aggregates for concrete shall conform to the gradations given in Table-I.

The gradation of combined coarse and fine aggregates shall be within the grading limit specified in Table-II.

The Fineness Modulus of fine aggregate (sand) shall be not less than 2.6 nor more than 3.1. In at least four out of five successive test samples, the modulus shall vary by not more than 0.20 from the moving average for the last five tests. The gradation of the coarse aggregate will be suitable if the results of four out of the last five consecutive tests comply with the gradation requirements.

Furnish certified test reports for aggregate tests listed in Table-III, Quality Tests.

#### 4.3 **Water**

Only clean water from the sources approved by the Engineer shall be used. The Contractor shall supply sufficient water for all purposes, including mixing the concrete, curing and cleaning plant and tools. Water analysis shall be performed in accordance with ASTM D596.

In case of doubt, the Engineer may require that concrete mixed with water proposed to be used should be tested to have a compressive strength not less than 90% of the strength of concrete mixed with distilled water.

#### 4.4 **Concrete Patching Compound**

Use an approved epoxy-resin compound applied according to manufacturer's instructions. Compound shall be paintable material which produces no evidence of bleeding and which, after final set, shall not be affected by high humidity and moisture. Epoxy-resin compound shall comply with FSMM-G-650 Type MA Grade C.



#### 4.5 Fibre Reinforced Concrete

Duracrete Polypropylene Fiber or approved equivalent concrete reinforcing: Concrete shall be treated with Duracrete polypropylene synthetic reinforcing fibers or approved equivalent when indicated on the drawings or as otherwise specified by the Engineer in accordance with the fiber manufacturer's recommendations.

- a. Synthetic reinforcing fibers shall be manufactured from virgin polypropylene.
- b. The dosage rate shall be 1.8 kg/cu.m (3.0 Lb/ Cu yd) of concrete.
- c. Fiber supplier shall provide technical assistance, if required.
- d. All fibers must meet or exceed the standards and specifications set forth in ACI 544, Fiber Reinforced Concrete.
- e. Listed below are the minimum properties of the polypropylene fibers for use. All fibers must meet or exceed the characteristics described in ACI-544, IR, Table 1.1, Fiber Reinforced Concrete.
  1. Tensile Strength: 4.4 grams/denier
  2. Elongation at break: 12%
  3. Fiber: 100% Fibrillated / Monofilament Polypropylene (as per site requirement)
  4. Lengths: 19 mm
  5. Absorption: Nil
  6. Specific gravity: 0.9
  7. Ignition point: 593 °C
  8. Melting point: 160-170 °C
  9. Heat & UV stabilization: Long term
  10. Thermal conductivity: Low
  11. Electrical conductivity: Low
  12. Salt resistance: High
  13. Acid resistance: High
  14. Alkali resistance: 100% (alkali proof)

#### 4.6 Additives

All additives shall be from a manufacturer approved by the Engineer.

Air Entraining Admixtures shall conform to ASTM C 260. Other admixtures shall conform to ASTM C 494.

Liquid Crystalline Water Proofing Bitocrete C-16 from Schomberg Germany or equivalent.

#### 4.7 Vapour Barrier

Polyethylene sheeting conforming to ASTM E154 and 0.2mm thick as a minimum. Other similar material having a vapour permeance rating not exceeding 0.5 per meter as determined by ASTM E96, will be considered unless noted otherwise.



#### 4.8 Grout

- a) Damp Pack Bedding Grout: Mix of one part Portland cement and 2 parts of fine aggregate proportioned by weight and not more than 4 gal. (17 liters) of water per bag of cement.
- b) Pre-mixed, Non-Shrink, Non-Metallic Grout: "Masterflow 713" manufactured by Master Builders, "Euco-N.S." manufactured by the Euclid Chemical Company or other approved equal.
- c) Pre-mixed, Non-Shrink, Metallic Grout: "Embeco636" manufactured by Master Builders, "Firmix" manufactured by the Euclid Chemical Co., or other approved product.
- d) Expansive Grout: CE CRD-C588, Type A or M, as required.

#### 4.9 Cover Material for Curing

Curing material shall conform to the following:

- a) Impervious Sheeting: ASTM C171, type optional, except that polyethylene sheeting shall be 0.1mm minimum thickness, white opaque. Where the work is exposed to high winds the impervious sheeting shall not be used.
- b) Burlap: Cloth made of jute or kenaf shall conform with AASHTO M182 and shall weigh a minimum 0.3kg/m<sup>2</sup>.
- c) Liquid Membrane Forming Compound: ASTM C309, Type 2.

#### 4.10 Joint Fillers

ASTM D 1751, preformed, resilient bituminous type or ASTM D1752, preformed sponge rubber.

#### 4.11 Joint Sealants

ASTM D 1190, ASTM D 3569, ASTM D 3406, hot-pour type.

#### 4.12 Waterstops

Provide flat, dumbbell type or center bulb type water stops at construction joints where shown. Web thickness not less than 5mm for units up to 125mm wide, and not less than 10mm for widths over 125mm. Provide polyvinyl chloride (PVC) waterstops of approved manufacturer.

#### 4.13 Epoxy Resin

ASTM C 881, type, Grade 3, Class C.

#### 4.14 Formwork



a) Formwork for Concrete Pavement

Forms shall be made of steel of an approved section, with a base width of at least two hundred (200) millimeters and the depth shall be equal to the thickness of the pavement at the edge as shown on the plans. The forms shall be staked with steel stakes, and stakes shall be of a length approved by the Engineer. Each section of forms shall have a stake pocket at each end and at intervals of not more than one and one-half (1.5) metres between ends. The stake pockets shall have approved devices for locking the form to the steel stakes. Each section of forms shall be straight and free from bends and warps at all times. No section shall show a variation greater than three (3) millimeter in three (3) metres from a true plane surface on the top of the form, and the inside face shall not vary more than six (6) millimeters from a plane surface.

Before placing forms, the underlying base shall be to the required grade, and shall be firm and compact. The forms shall have full bearing upon the foundation throughout their length and shall be placed with exactness to the required grade and alignment of the edge of the finished pavement. They shall be so supported during the entire operation of placing, tamping and finishing the pavement that they will not deviate vertically at any time more than three (3) millimeters from the proper elevation.

Forms shall not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully removed in a manner to avoid damage to the pavement. Under no circumstances will the use of pry bars between the forms and the pavement be permitted. Pavement, which in the opinion of the Engineer, is damaged due to the careless removal of forms shall be repaired by the Contractor, as directed by the Engineer, at the Contractor's own expense.

Forms shall be thoroughly cleaned and oiled each time they are used.

When pavement is placed adjoining existing concrete pavement upon which the finishing machine will travel, any irregularities in the old pavement shall be ground down to a true, uniform surface, of sufficient width to accommodate the wheels of the finishing equipment, if necessary to obtain proper smoothness of the pavement.

b) Formwork for Structures

Material, workmanship etc. of formwork for structures, refer specification Section 2100.

#### 4.15 Reinforcement

Materials for reinforcing steel, welded wire fabric, dowels and tie bars, refer specification Section 2200.

### 5.0 MATERIAL TESTING

#### A. Samples and Testing



Samples from stock on the site or suppliers materials shall be taken by the Contractor in presence of the Engineer. Furnish tests and certificates as specified.

B. Cement

Sampled cement shall be tested by a testing laboratory. Certified copies of laboratory test reports shall be furnished for each lot of cement and shall include all test data, results and certification that the sampling and testing procedures are in conformance with the Specifications for approval. No cement shall be used until test results are satisfactory. Cement that has been stored for more than four months after being tested shall be re-tested before use. Cement found unsatisfactory under test shall be immediately removed from the construction site or supplier stock.

C. Aggregates

Aggregate sampling shall conform to ASTM D 75. Aggregates shall be sampled and tested by a testing laboratory. No aggregate shall be used until test results are satisfactory to the Engineer.

D. Water

Water analysis shall be performed in accordance with ASTM D 596, and the report shall be submitted for Engineer's approval.

E. Admixtures

Sampling and testing of all admixtures used in concrete mix shall be in accordance with the standard procedure recommended by an approved testing laboratory. No admixture shall be used until test results are satisfactory and approved.

F. Concrete

- a) Compressive Strength: The Contractor shall provide and test three sets of specimens taken under the supervision of the Engineer from each 125 cubic metres or not less than once a day from each grade of concrete placed. Samples shall be secured in accordance with ASTM C 172. Test specimens shall be made and cured in accordance with ASTM C-31. Specimens shall be tested in accordance with ASTM C39 or ACI-214. Test specimens shall be evaluated for each grade of concrete specified in conformance with ACI318, chapter "Concrete Quality". The standard age of concrete for tests shall be 3, 7 and 28 calendar days.
- b) Slump and Entrained Air: Slump test and entrained air tests shall be performed in the field under the supervision of the Engineer. Slump test shall conform to ASTM C 143 and entrained air content shall be determined in accordance with ASTM C 231 or C 173 as applicable.



- c) Concrete removed for the Structure: When the results of the strength test of the specimen indicate deficiency in specified requirements or where there is other evidence that the quality of concrete is below specified requirements, core boring tests shall be made in conformance with ASTM C-42. If a deficiency is discovered, the Contractor may be allowed to make load test, at his expense, and results shall be evaluated in conformance with ACI 318, Chapter 20.

## 5.1 Frequency of Testing

- a) The following tests shall be performed initially for approval and as per required frequency thereafter:

-	Aggregates	ASTM C 33	-----
-	Soundness	ASTM C 88	bi-weekly
-	Specific Gravity	ASTM C 127	weekly
-	Absorption	ASTM C 128	weekly
-	Abrasion	ASTM C 131	weekly
-	Gradation	ASTM C 136	daily
-	Sand Equivalent	ASTM C 217	weekly
-	Cleanliness	ASTM C 227	weekly
-	Elongation	CRD C 119	bi-weekly
-	Chloride Ion	ASTM D 512	bi-weekly
-	Water Analysis	ASTM D 596	bi-weekly

- b) The following tests shall be performed initially for approval and thereafter as specified:

- *Concrete Compressive Strength:* ASTM C39. Three sets of specimens for each 75 cu.m of each grade of concrete placed or at least three sets for each grade per work shift.
- *Flexural Strength:* Three sets of specimens for each 100 cu.m of concrete placed or at least three sets per work shift. The concrete shall be sampled in accordance with ASTM C172. Flexural strength specimens shall be made in accordance with ASTM C 31 and tested in accordance with ASTM C 78.
- *Sulphate (S03) Content, Chloride Content and pH value:* One test per month for each grade of concrete. Broken laboratory specimens from strength tests shall be used for hardened concrete Sulphate, Chloride content and pH Value tests.

## 6.0 EXECUTION

### 6.1 Nominal Concrete Mixes



6.1.1 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 as per ACI 211 & ACI 318 so as to provide the concrete of the required crushing strength when tested as set out in Table 1.

6.1.2 The Contractor shall regulate and arrange mixing of the ingredients for the designed mix of the concrete by weight-batching.

6.1.3 Water/Cement Ratio

The quantity of water used shall be just sufficient to produce a dense concrete of the specified strength. For all exterior exposed work and foundations the water/cement ratio shall not exceed 0.45, allowance being made for any water in the fine and coarse aggregates.

6.1.4 Workability

Admixtures may be used where necessary to achieve required workability, with the Engineer's approval. For concrete pavements, the mix determined shall be workable concrete having a slump between 13mm and 50mm, as determined by ASTM C143. For other structures the concrete shall be proportioned and produced to have a slump of 75mm or less if consolidation is to be by vibration, and 125mm or less if consolidation is to be by methods other than vibration.

6.2 **Strength and Durability Requirements for Concrete**

Strength and Durability Requirements for Concrete are given below :

<u>days (MPa)</u>	<u>Class of Concrete</u>	<u>Specified Cylinder Compressive Strength at 28</u>
	A1	35.0
	A	28.0
	B	21.0
	C	17.0
	D	8.0
	E	5.0

The flexural strength of concrete for pavement shall be 4.5 MPa at 28 days as per ASTM C 78 with minimum cement content of 340Kg of cement per cubic metre of concrete. The flexural strength requirement is the governing factor, excess cement if any used to achieve the required flexural strength shall not be payable.

6.2.1 The Contractor shall adopt all necessary measures as per ACI 201.2, like proper grading of aggregates, control of water cement ratio and cement



content, proper compaction and curing, to achieve dense and durable concrete.

- 6.2.2 The Contractor shall submit mix design by weight for each grade of concrete at least 45 calendar days before any placement of concrete, along with samples of the proposed materials. Manufacture 12nos. test cylinders 12" (305mm) x 6" (152mm) in accordance with ASTM C-31, and in accordance with the mix design batching by weight and test 3 cylinders each at 3, and 28 days in the presence of Engineer's Representative, in accordance with ASTM C-39 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.

### 6.3 Batching

- 6.3.1 All cement, including cement supplied in bulk, shall be batched by weight. A bag of cement may be taken as 50 kg.
- 6.3.2 Aggregates shall be batched by weight, due allowance being made for water content. Aggregates may be batched by volume only with the prior permission of the Engineer. The apparatus for weight batching may be as 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 week.
- 6.3.3 The quantity of additives shall be as prescribed by the manufacturer or as directed by the Engineer.

### 6.4 Mixing

- 6.4.1 The concrete shall be mixed in an approved batch mixer. 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.
- 6.4.2 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. However, minimum mixing time shall not be less than 1-1/2 minutes.

If it is desired to use a mixing period of less than 1-1/2 minutes, the Engineer's approval shall be obtained in writing.

- 6.4.3 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.
- 6.4.4 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.



6.4.5 Concrete shall be mixed only in quantities for immediate use. Concrete which has set shall not be re-tempered, but shall be discarded.

## 6.5 Transporting

6.5.1 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 re-handling or flowing. All skips vehicles, or containers used for transporting the concrete shall be thoroughly clean.

6.5.2 During hot or cold weather, concrete shall be transported in deep containers, on account of their 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.

a) Batching: The Contractor shall submit to the Engineer for review the plans and capacity of the concrete batching plant and delivery equipment, which shall comply with ASTM C-94.

The Contractor shall furnish test certificates for the scales and metering devices before producing concrete and at least every six weeks thereafter.

b) Accuracy of Plant Batching: Cement measured by weight in individual batchers shall be within  $\pm 1.0$  percent of the desired intermediate and final weights in cumulative batchers. The minimum batching accuracy shall be  $\pm 0.3$  percent of scale capacity for small loads below 30 percent of scale capacity.

Aggregate measured by weight in individual batchers shall be within  $\pm 2.0$  percent of the desired weight, or within  $\pm 1.0$  percent of the desired intermediate and final weights in cumulative batchers; but in either case, the minimum batching accuracy shall be  $\pm 0.3$  percent of scale capacity for small loads below 15 percent and 30 percent of scale capacity, respectively.

Water measured by volume or by weight shall be within  $\pm 1.0$  percent of the desired amount.

Liquid admixtures measured by volume or by weight shall be within  $\pm 1.0$  percent of the desired amount.

Compensation for changes of moisture content in fine and coarse aggregate shall be made by devices which shall correct the batch water and the weight of the affected aggregate simultaneously without changing the batch setting.

c) Mixing and Delivery: Concrete shall be mixed completely in the batching plant. Records shall be kept of water added in normal batching.



Concrete shall be transported to the point of discharge in agitator-mixer trucks, or by other approved means.

Trip tickets shall be provided for each delivery. The tickets shall show the designation of the materials in each batch, measured weight or volume of materials, methods of cooling concrete, class of concrete, batch number, mixer number, batch volume, date and time water was added to the mix, time of discharge from the mixer, and delivery truck number.

When it is necessary to add water to the agitator-mixer, it shall be done in accordance with ASTM C 94 and recorded.

## 6.6 Concrete for Pavement

6.6.1 The base upon which the concrete pavement is laid shall have been constructed or prepared under other relevant section of the specifications and shall be smooth, compacted and true to the grade and cross-section shown on the drawing and shall be maintained throughout the period of placing concrete pavement.

To prevent flow of cement slurry from concrete, polyethylene sheet 0.2mm thick as vapour barrier, as per relevant section of specifications shall be placed on cement treated base coarse, prior to placing of concrete.

### 6.6.2 Formwork

Before placing forms, the underlying base shall be to the required grade, and shall be firm and compact. The forms shall have full bearing upon the foundation throughout their length and shall be placed with exactness to the required grade and alignment of the edge of the finished pavement. They shall be so supported during the entire operation of placing, tamping and finishing the pavement that they will not deviate vertically at any time more than three (3) millimeters from the proper elevation.

Forms shall not be removed for at least twelve (12) hours after the concrete has been placed. Forms shall be carefully removed in a manner to avoid damage to the pavement. Under no circumstances will the use of pry bars between the forms and the pavement be permitted. Pavement, which in the opinion of the Engineer, is damaged due to the careless removal of forms shall be repaired by the Contractor, as directed by the Engineer, at the Contractor's own expense.

Forms shall be thoroughly cleaned and oiled each time they are used.

When pavement is placed adjoining existing concrete pavement upon which the finishing machine will travel, any irregularities in the old pavement shall be ground down to a true, uniform surface, of sufficient width to accommodate the wheels of the finishing equipment, if necessary to obtain proper smoothness of the pavement.



### 6.6.3 Placing Reinforcement

All pavement reinforcement shall be placed as shown on the plans. All reinforcement required by the works shall be held in proper position by sufficient number of metal bar supports or chairs as approved by the Engineer. The dowels may be installed mechanically by means of equipment and methods approved by the Engineer. The satisfactory placement of the dowels shall depend upon the ability of the mechanical device to place the dowels in their true position. The Engineer may require, when satisfactory placement is not obtained by mechanical means, that the dowels be installed ahead of placing the concrete and that they be securely staked and tied if necessary to hold them in their exact position. The use of removable devices, supporting the bars from the forms, will not be permitted.

### 6.6.4 Placing Concrete

#### a) General

The concrete shall be deposited on the base course in successive batches for the full width between forms and in a manner which will require as little re-handling as possible. Spreading shall be done by an approved mechanical spreader in a manner that will prevent segregation and separation of the materials. Necessary hand spreading shall be done with shovels, not rakes. Workmen shall not be allowed to walk in the freshly mixed concrete with boots or shoes coated with earth or foreign substances. The amount of material deposited shall be sufficiently in excess of that required to form the pavement to the required cross section after consolidation in order to provide a roll of concrete ahead of the front screed of the finishing machine for the full length of the screed.

When concrete is placed adjoining a previously constructed lane of pavement and when mechanical equipment will be operated upon the existing lane of pavement, the concrete shall be at least 7 days old and at a flexural strength approved by the Engineer. If only finishing equipment is carried on the existing lane, paving in adjoining lanes may be permitted after 3 days, if approved by the Engineer.

Concrete shall be thoroughly consolidated against and along the full length and on both sides of all expansion joint assemblies, by means of vibrators inserted in the concrete. Vibrators shall not be permitted to come in contact with a joint assembly, the grade, or a side form. In no case shall the vibrator be operated longer than fifteen (15) seconds in any one location.

Concrete shall be deposited as near to expansion and contraction joints as possible without disturbing them, but shall not be dumped from the discharge bucket or hopper onto a joint assembly unless the hopper is well centered on the joint assembly. Damage to joint assemblies caused by dumped concrete shall be repaired.



immediately, as directed by the Engineer, at the Contractor's expense.

Should any concrete materials fall on or be worked into the surface of a completed slab, they shall be removed immediately by methods approved by the Engineer.

Placement of concrete ahead of the initial spreader strike-off shall not be more than fifteen (15) minutes ahead of final spreader strike-off. If concrete is placed in one (1) layer only, the placement of concrete shall not be more than twenty (20) minutes ahead of the spreader strike-off.

b) Works in extreme weather

Unless authorized in writing by the Engineer, mixing and concreting operations shall be discontinued when a descending air temperature in the shade and away from artificial heat reaches 4°C and shall not be resumed until an ascending air temperature in the shade and away from artificial heat reaches 2°C. When concreting is authorized during cold weather, the Engineer may require the aggregates to be heated by either steam or dry heat prior to being placed in the mixer. The apparatus used shall heat the mass uniformly and shall be arranged to preclude the possible occurrence of overheated areas which might be detrimental to the materials. Unless otherwise authorized, the temperature of the mixed concrete shall not be less than 10°C at the time of placement in the forms.

If the air temperature is 2°C or less at the time of placing concrete, the Engineer may require the water and/or the aggregate to be heated to not less than 21°C nor more than 66°C. Concrete shall not be placed on frozen sub-grade nor shall frozen aggregates be used in the concrete.

During periods of warm weather when the maximum daily air temperature exceeds 30°C, the following precautions should be taken. The forms and/or the underlying material shall be sprinkled with water immediately before placing the concrete. The concrete shall be placed at the coolest temperature practicable, and in no case shall the temperature of the concrete when placed exceed 32°C. The aggregates and/or mixing water shall be cooled as necessary to maintain the concrete temperature at or not more than the specified maximum.

6.6.5 Joints

a) General

Joints shall be constructed exactly in accordance with the details shown on the plans and the Specifications and with the best of workmanship.



b) Expansion Joints

Expansion joints shall be of the type and dimensions and of the spacing shown on the plans. Joint filler shall be of premolded compressible material according to ASTM D1751 or ASTM D1752, and joint sealant material shall be according to ASTM D1190.

The entire joint assembly shall be of a type designated on the plans and shall be installed in such a position that the centerline of the joint assembly is perpendicular to the centerline of the pavement slab and the dowels lie parallel to the centerline of the slab. Finished joints shall not deviate more than six (6) millimeters in the horizontal alignment from a straight line. No plugs of concrete shall be permitted anywhere within the expansion space.

One-half of the length of each dowel bar shall be painted, and then thoroughly coated with hard grease, or lubricant as approved by the Engineer, to prevent the concrete from bonding to that portion of the dowel.

An expansion cap of the dimensions shown on the plans shall be placed on the greased end of each dowel. The greased ends shall be free to slide in the dowel holder and shall extend in the direction as indicated on the plans. Any excess grease on the dowel holder shall be removed.

The joint shall be securely staked or fastened in place prior to placing the concrete and in a manner to ensure that the joint and the dowel bars will remain in their proper position after the concreting and finishing operations are completed.

The finishing machine shall be operated in a manner that will prevent displacement of the joint. If for any reason it is necessary to straighten a joint, any depressions caused by this operation shall immediately be filled with fresh concrete, re-spaded and brought to the original crown in advance of the longitudinal finishers. Any fluid laitance or mortar caused by this operation shall be removed and replaced with fresh concrete.

As the finishing machine approaches the joint on the first trip, the excess concrete shall be shoveled ahead and the tamper and each screed, in turn, shall be lifted over the joint. On the second trip of the finishing machine, the screed may be operated over the joint.

c) Contraction Joints

Contraction joints shall be of the type and dimensions and at the spacing shown on the plans.



Sawed contraction joints shall be cut by means of an approved concrete saw. The joints shall not be sawed until the concrete has hardened to the extent that tearing and raveling is precluded.

All joints shall be sawed during the initial curing period and the sawing shall begin before the pavement starts shrinking and before uncontrolled cracking takes place.

Any procedure which results in premature and uncontrolled cracking shall be revised immediately by adjusting the sequence of cutting the joints or the time interval involved between the placing of the concrete or the removal of the curing media and the cutting of the joints. In no case shall the pavement be left overnight without having the joints sawed.

The joints shall be sawed at the depth, spacing, and lines shown on the plans. Guidelines or devices approved by the Engineer shall be provided to ensure cutting the joint in a straight line and perpendicular to the centerline of the pavement.

The dust resulting from sawing shall be completely removed from the joint and adjacent areas by means of an air jet or a combination of air and water applied under pressure immediately after the joint has been cut, and before filling with joint sealant.

When the plans specify that dowels be installed through contraction joints, the base course at the contraction joints shall be accurately trimmed to the required cross section and to the proper depth of the pavement.

A string line shall be stretched between the pavement forms along the centerline of the joint.

Each dowel shall be painted and thoroughly coated with hard grease, or lubricant, in accordance with the directions shown on the plans or as approved by the Engineer, to prevent the concrete from bonding to that portion of the dowel.

The entire joint assembly shall be an approved type and shall be installed in such a position that the centerline of the joint assembly is perpendicular to the centerline of the pavement and the dowels lie parallel to the pavement surface parallel to the centerline of the pavement.

The greased ends of the dowels shall be placed in the direction as indicated on the plans and shall be free to slide in the dowel holder. Any excess hard grease on the dowel holder shall be removed.

d) Construction Joints



A butt construction joint shall be made perpendicular to the centerline of the pavement at the close of each day's work and also when the process of depositing concrete is stopped for a length of time such that, in the opinion of the Engineer, the concrete will have taken its initial set. This joint shall be formed by using a clean plank header having a nominal thickness of fifty (50) millimeters, a width of not less than the thickness of the pavement and a length of not less than the width of the pavement. The header shall be cut true to the cross-section of the finished pavement and shall be accurately set and held in place in a plane at right angles to centerline and perpendicular to the surface of the pavement.

The top surface of the header shall be protected with steel as approved by the Engineer. On the face along the center of the header there shall be fastened a trapezoidal piece of metal or wood the full length of the header. Seventy millimeters wide and at least forty millimeters in depth as per drawing to form a grooved joint. The header shall have drilled holes to accommodate the dowel or tie bars hereinafter specified. Upon resumption of work any surplus concrete remaining upon the base course shall be removed. The header shall then be carefully removed and fresh concrete deposited against the old in such a manner as to avoid injury to the edge of the old concrete. The fresh concrete shall be vibrated into the groove in a manner to ensure an interlocking joint.

Dowel bars or load transfer devices shall be used in all construction joints in accordance with the details shown on the plans. The edges of the joint shall be grooved, edged, and sealed with the material used for sealing expansion and contraction joints.

No construction joint shall be placed within three (3) metres of an expansion, contraction, or other construction joint.

#### 6.6.6 Consolidating and Finishing for Concrete Pavement

- a) Sequence: The sequence of operations shall be the strike-off and consolidation, floating and removal of laitance, straight edging, and final surface finish. The addition of superficial water to the surface of the concrete to assist in finishing operations generally will not be permitted. If the application of water to the surface is permitted by the Engineer, it shall be applied as a fog spray by means of approved spray equipment.
- b) Finishing at Joints: The concrete adjacent to joints shall be compacted or firmly placed without voids or segregation against the joint material; it shall be firmly placed without voids or segregation under and around all load-transfer devices, joint assembly units, and other features designed to extend into the pavement. Concrete adjacent to joints shall be mechanically vibrated as required in subsection 6.4.4. After the concrete has been placed and vibrated adjacent to the joints, the finishing machine shall be operated in a manner to avoid damage or misalignment of joints. If uninterrupted

operations of the finishing machine, to over and beyond the joints, cause segregation of concrete, damage to, or misalignment of the joints, the finishing machine shall be stopped when the screed is approximately 20cm from the joint. Segregated concrete shall be removed from the front of and off the joint; the screed shall be lifted and set directly on top of the joint, and the forward motion of the finishing machine shall be resumed. Thereafter, the finishing machine may be run over the joint without lifting the screed, provided there is no segregated concrete immediately between the joint and the screed or on top of the joint.

- c) **Machine Finishing:** The concrete shall be spread as soon as it is placed, and it shall be struck off and screeded by an approved finishing machine. The machine shall go over each area as many times and at such intervals as necessary to give the proper consolidation and to leave a surface of uniform texture. Excessive operation over a given area shall be avoided. When side forms are used, the tops of the forms shall be kept clean by an effective device attached to the machine, and the travel of the machine on the forms shall be maintained true without lift, wobbling, or other variation tending to affect the precision finish. During the first pass of the finishing machine, a uniform ridge of concrete shall be maintained ahead of the front screed for its entire length. When in operation, the screed shall be moved forward with a combined longitudinal and transverse shearing motion, always moving in the direction in which the work is progressing, and so manipulated that neither end is raised from the side forms during the striking-off process. If necessary, this shall be repeated until the surface is of uniform texture, true to grade and cross section, and free from porous areas.
- d) **Hand Finishing:** Hand finishing methods will not be permitted, except under the following conditions. In the event of breakdown of the mechanical equipment, hand methods may be used to finish the concrete already deposited on the grade; in areas of narrow widths or of irregular dimensions where operation of the mechanical equipment is impractical. Concrete, as soon as placed, shall be struck off and screeded. An approved portable screed shall be used. A second screed shall be provided for striking off the bottom layer of concrete when reinforcement is used.

The screed for the surface shall be at least 0.6m longer than the maximum width of the pavement to be struck off. It shall be of approved design, sufficiently rigid to retain its shape, and shall be constructed either of metal or of other suitable material covered with metal. Consolidation shall be attained by the use of a suitable vibrator.

- e) **Floating:** After the concrete has been struck off and consolidated, it shall be further smoothed, trued, and consolidated by means of a longitudinal float, using one of the following methods:



1. Hand Method: The hand-operated longitudinal float shall not be less than 3.6 m in length and 15 cm in width, properly stiffened to prevent flexibility and warping. The longitudinal float, operated from foot bridges resting on the side forms and spanning but not touching the concrete shall be worked with a sawing motion, while held in a floating position parallel to the pavement centerline and passing gradually from one side of the pavement to the other. Forward movement along the centerline of the pavement shall be in successive advances of not more than one-half the length of the float. Any excess water or soupy material shall be wasted over the pavement edge on each pass.
2. Mechanical Method: The Contractor may use a machine composed of a cutting and smoothing float(s), suspended from and guided by a rigid frame. The frame shall be carried by four or more visible wheels riding on and constantly in contact with, the side forms or pavement subgrade. If necessary, long-handled floats having blades not less than 1.5 m in length and 1.5 cm in width may be used to smooth and fill in open textured areas in the pavement. Long-handled floats shall not be used to float the entire surface of the pavement in lieu of mechanical methods. When strike-off and consolidation are done by hand and the crown of the pavement will not permit the use of the longitudinal float, the surface shall be floated transversely by means of a long-handled float. Care shall be taken not to work the crown out of the pavement during the operation. After floating any excess water and laitance shall be removed from the surface of the pavement by a straightedge 3m or more in length. Success drags shall be lapped one-half the length of the blade.

- f) Straight-edge Testing and Surface Correction: After the pavement has been struck off and consolidated and while the concrete is still plastic, it shall be tested for trueness with a 5m straightedge. For this purpose, the Contractor shall furnish and use an accurate 5m straightedge swung from handles 0.9 m longer than one-half the width of the pavement. The straight edge shall be held in contact with the surface in successive positions parallel to the centerline of the pavement and the whole area gone over from one side of the pavement to the other, as necessary. Advancing shall be in successive stages of not more than one-half the length of the straight edge. Any excess water and laitance shall be removed from the surface of the pavement. Any depressions shall be immediately filled with freshly mixed concrete, struck off, consolidated and refinished. High areas shall be cut down and refinished. Special attention shall be given to assure that the surface across joints meets the requirements for smoothness. Straightedge testing and surface corrections shall continue until the entire surface is found to be free from observable departures from the straight edge and until the slab conforms to the required grade and cross section. The use

of long-handled wood floats shall be confined to a minimum; they may be used only in emergencies and in areas not accessible to finishing equipment.

#### 6.6.7 Surface Texture

The surface of the pavement shall be finished with broom finish for all newly constructed concrete pavements.

Brush or Broom Finish: If the pavement surface texture is to be a type of brush or broom finish, it shall be applied when the water sheen has practically disappeared. The equipment shall operate transversely across the pavement surface, providing corrugations that are uniform in appearance and approximately 2mm in depth. It is important that the texturing equipment not tear or unduly roughen the pavement surface during the operation. Any imperfections resulting from the texturing operation shall be corrected.

#### 6.6.8 Skid Resistant Surfaces

In addition to broom and brush finish in the plastic concrete pavement skid resistant surfaces comprising either saw-cut grooves, plastic grooves or wire combing shall be provided as specified below and as directed by the Engineer.

- a) Sawcut Grooves: For new concrete pavements that have hardened, transverse grooves shall be saw-cut in the pavement forming a 6mm by 6mm by 31mm configuration. The grooves shall be continuous for the entire runway length. They shall be saw-cut transversely in the runway pavement to within 3m of the runway pavement edge to allow adequate space for equipment operation. The maximum transverse saw-cut grooves shall not exceed 40 m. The tolerances for the saw-cut grooves shall meet the following:

Alignment tolerance.

Plus or minus 38 mm in alignment for 23 m.

Groove tolerance.

Minimum depth 5 mm.

Maximum depth 8 mm.

Minimum width 5 mm.

Maximum width 8 mm.

Center-to-center spacing.

Minimum spacing 31 mm.

Maximum spacing 50 mm.

Saw-cut grooves shall not be closer than 76mm to transverse paving joints. Grooves may be continued through longitudinal construction joints. Cleanup of waste material shall be continued during the



grooving operation. Waste material may be disposed of by either flushing with water, sweeping, or vacuuming. Waste material must not be allowed to enter the storm or sanitary sewer system.

- b) Plastic grooves: The grooves formed in the plastic concrete shall be 6mm by 6 mm by 31 mm. The grooves shall be continuous for the entire runway length and width. The tolerances for the grooves formed in plastic concrete shall meet the following:

Alignment tolerance.

Plus or minus 76 mm in alignment for 23 m.

Groove tolerance.

Minimum depth 3 mm.

Maximum depth 10 mm.

Minimum width 3 mm.

Maximum width 10 mm.

Center-to-center spacing.

Minimum spacing 31 mm.

Maximum spacing 50 mm.

- c) Wire Combing: The wire combing technique shall use steel combs or tines of various dimensions to form groove-like texture in the plastic concrete pavement and shall provide grooves that are approximately 3 mm by 3 mm spaced 13 mm center-to-center.

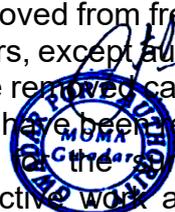
#### 6.6.9 Surface Test

As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 5 m straight edge or other specified device. Areas in a slab showing high spots of more than 6 mm but not exceeding 13 mm in 5 m shall be marked and immediately ground down with an approved grinding machine to an elevation that will fall within the tolerance of 6 mm or less. Where the departure from correct cross section exceeds 13 mm, the pavement shall be removed and replaced at the expense of the Contractor when so directed by the Engineer.

Any area or section so removed shall not be less than 3 m in length nor less than the full width of the lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than 3 m in length shall also be removed and replaced.

#### 6.6.10 Removing Forms

Unless otherwise provided, forms shall not be removed from freshly placed concrete until it has set for at least twelve (12) hours, except auxiliary forms used temporarily in widened areas. Forms shall be removed carefully so as to avoid damage to the pavement. After the forms have been removed, the sides of the slab shall be cured as specified on the surface. Major honeycombed areas will be considered as defective work and shall be



removed and replaced at the Contractor's expense, as directed by the Engineer. Any area or section so removed shall not be less than three (3) metres in length nor less than the full width of the paving lane involved. When it is necessary to remove and replace a section of pavement, any remaining portion of the slab adjacent to the joints that is less than three (3) metres in length, shall also be removed and replaced.

#### 6.6.11 Protecting and Curing of Concrete Pavement

##### a) Initial Curing

As the surface of the freshly laid pavement is progressively finished, the initial curing and protection operations shall commence.

Upon completion of the finishing operation and while the surface of concrete is still moist, but no free water remains, a liquid curing membrane, as specified in ASTM C309 (Type 2) shall be applied to the exposed surfaces of the pavement at the rate of not less than one (1) liter per three and two-thirds ( $3\frac{2}{3}$ ) square metres of surface area when mechanical pressure distributors are used. The curing membrane, except on irregular areas, shall be applied by means of approved self-propelled mechanical pressure distributors or approved hand sprays. Satisfactory means shall be provided for thoroughly mixing the curing membrane compound before and during its use.

The mechanical spraying equipment shall include a full width spray bar equipped with multiple nozzles or a traversing spray which travels from one edge of the pavement to the other. In either case the path of adjacent nozzles or passes of the traversing spray shall overlap minimum of one-half ( $1/2$ ) the width of the spray pattern so that all portions of the surface shall receive double applications from adjacent nozzles or passes. The pumping, pressure, and distribution arrangement shall be correlated with the forward speed to provide adequate and uniform coverage of the pavement at not less than the minimum rate required. Irregular areas to which the mechanical distributor cannot be adapted may be covered with hand sprays.

When hand sprays are used, the curing membrane shall be applied in two(2) applications, each at a rate of not less than one (1) liter per five(5) square metres of surface area so as to provide a total rate of application of one (1) liter per two and one-half ( $2\frac{1}{2}$ ) square metres of surface area. The path of the spray on the second application shall be at right angles to the path of the spray on the first application. When hand operated sprays are permitted, the equipment supplying the pressure to the spray nozzle shall be capable of supplying constant and uniform pressure to provide uniform and adequate distribution of the curing membrane compound at the rates required. If from any cause, such as rainfall soon after its application, the curing membrane is damaged, the Contractor shall immediately apply another application of curing membrane to the surface of the pavement. The rate of application

for the replacement membrane shall be the same as for the original membrane.

Unless otherwise directed by the Engineer, immediately following the application of the curing membrane, an approved shade structure with canvas shall be placed approximately 300 mm above the pavement surface. The shade structure with canvas shall be constructed of materials and in a manner approved by the Engineer. In no case shall any portion of the shade canvas come in contact with the pavement. The concrete pavement shall not be exposed to the direct rays of the sun for more than one (1) hour, within the first twenty-four hours. The initial curing shall be continued for a period of twenty four (24) hours from the time the curing membrane is applied.

When forms are removed, the edges of the pavement shall receive curing membrane at the rate of coverage specified for the pavement surface.

The curing membrane may be applied to the vertical edges of the pavement by means of hand sprays or by nozzles attached to the mechanical distributor, but the edges of the pavement shall be covered with curing membrane at the rate specified within thirty (30) minutes after removal of the forms.

When hot-poured joint compound is used, all joints shall be sawed during the initial curing period. The shade-canvas may be moved at joint locations for short periods of time to permit the sawing. Before being sealed, the joints shall be thoroughly cleaned of all loose saw dust, laitance, dirt, other foreign matter, and free of water. As the method of final curing is different from that of the initial curing, the cleaning, and sealing of joints shall be performed immediately following the removal of the shade-canvas at the end of the initial curing period and prior to the application of the polyethylene sheeting.

In no case shall any portion of the concrete pavement be exposed to the direct rays of the sun for more than one (1) hour.

b) Final Curing:

Following jointing operations, curing membrane shall be applied to the joint area at the rate specified for the pavement surface.

Upon completion of the initial curing period and after the shade canvas has been removed and jointing operation has been completed including application of curing membrane, the pavement shall be completely covered with white opaque polyethylene film as specified in AASHTO M-171. Adjoining sheets shall be lapped a minimum of four hundred and fifty (450) millimetres. The sheeting shall be held in place in a manner approved by the Engineer.



Final curing shall be continued until the concrete reaches an age of fourteen (14) days. During this period, the curing membrane and polyethylene film shall be protected from damage from any cause. Any damage from any cause shall be immediately repaired by the Contractor at his expense. No traffic, including workmen shall be allowed on the surface of the pavement until the expiration of the fourteen (14) day curing period, or as directed by the Engineer.

#### 6.6.12 Sealing Joints

a) Materials

Joint sealant shall be hot-poured elastic type compound, fuel-resistant complying with ASTM D3569 for airfield pavements and ASTM D3406 for other pavements.

b) Execution

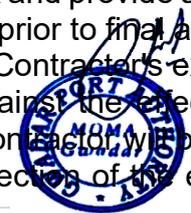
After the fourteen (14) day curing period for the pavement has elapsed, the jute or other protective covering shall be removed from the joint and the joint thoroughly cleaned of all loose scale, saw dust, dirt, laitance or other matter.

Cleaning may be accomplished with a compressed air jet, air and water under pressure, wire brushes or in extreme cases the joint shall, when directed by the Engineer, be resawed to ensure a completely clean joint. The joint surfaces and adjacent areas of the slab shall be thoroughly clean.

The hot-poured joint material shall be heated in a approved heating unit to the temperature within the range required as shown by tests. The joint shall be filled from the bottom of the saw cut to the surface of the pavement. Any joint with a depth greater than twenty-five (25) millimeters shall be filled with a minimum of two (2) layers, each layer being approximately equal in depth. The material shall be poured within the required temperature in the workman like manner neatly so that it should not spread on the sides of the joint and is evenly placed.

#### 6.6.13 Protection of Pavement

The Contractor shall protect the pavement and its appurtenances against both public traffic and traffic caused by the Contractor's employees and agents. This shall include watchmen to direct traffic and the erection and maintenance of warning signs, lights, pavement bridges, or crossovers, etc. The Contractor's plans or special provisions will indicate the location and type of device or facility required to protect the work and provide adequately for traffic. Any damage to the pavement occurring prior to final acceptance shall be repaired or the pavement replaced at the Contractor's expense. In order that the concrete be properly protected against the effects of rain before the concrete is sufficiently hardened, the Contractor will be required to have available at all time materials for the protection of the edges and



surfaces of the unhardened concrete. Such protective materials shall consist of rolled polyethylene sheeting at least 4 mils (0.1 mm) thick of sufficient length and width to cover the plastic concrete slab and any edges. The sheeting may be mounted on either the paver or a separate movable bridge from which it can be unrolled without dragging over the plastic concrete surface. When rain appears imminent, all paving operations shall stop and all available personnel shall begin cover the surface of the unhardened concrete with the protective covering.

#### 6.6.14 Opening to Traffic

The Engineer shall decide when the pavement shall be opened to traffic. The pavement will not be opened to traffic until test specimens molded and cured in accordance with ASTM C31 have attained a flexural strength of 550 pounds per square inch (3.792 MPa) when tested in accordance with ASTM C78. If such tests are not conducted, the pavement shall not be opened to traffic until 14 days after the concrete was placed. Prior to opening to traffic, the pavement shall be cleaned.

#### 6.6.15 Surface Tolerances

Extreme care must be exercised in all phases of the operation to assure the pavement will pass the specified tolerances. The following tolerances are applicable:

- a) Lateral deviation from established alignment of the pavement edge shall not exceed plus or minus 30 mm in any lane.
- b) Vertical deviation from established grade shall not exceed plus or minus 12mm at any point.
- c) Surface smoothness deviations shall not exceed 6 mm from a 5m straight edge placed in any direction, including placement along and spanning any pavement joint or edge.

#### 6.6.16 Tolerance in Pavement Thickness

Areas found deficient in thickness by more than 1.0 inch (25 mm) shall be evaluated by the Engineer and, if the deficient areas warrant removal, they shall be removed and replaced with concrete of the thickness shown on the plans.

### 6.7 Embedded Items

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

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 water-tightness fully equal to that of the continuous waterstop material,



shall permanently develop mechanical strength not less than that of the parent section, and shall permanently retain their flexibility.

6.7.2 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 50mm 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.

6.7.3 All sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.

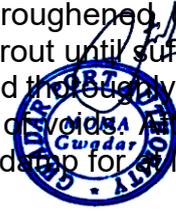
All Contractors whose work is related to the concrete or must be supported by it shall be given ample notice and opportunity to introduce and/or furnish embedded items before the concrete is placed.

6.7.4 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 approved readily removable material to prevent the entry of concrete into the voids.

6.7.5 Non-Shrink Grout

Grout of placement under base and bearing plates of steel, machinery and equipment, for grouting anchor bars and dowels and for similar uses shall be as specified. The grout shall be used in accordance with the following and as per manufacturer's recommendations, and as directed by the Engineer.

Concrete surfaces to receive non-shrink grout shall be roughened, cleaned and dampened. Form shall be provided to retain the grout until sufficiently hard to support itself. Grout shall be poured in place and thoroughly rodded or strapped to prevent air entrapment and formation of voids. After non-shrink grout has received its initial set, it shall be kept damp for at least 24 hours



**TABLE I: Gradation of Concrete Aggregates**

Percentage by Weight Passing

Particle Size Square Openings (Equivalent (Sand) U.S. Sieve Designation)	Coarse		Fine		
	19 mm to 5 mm	25 mm to 5 mm	37.5 mm to 19 mm	50 mm to 25 mm	
	¾"-No.4	1"-No.4	1½ "-3/4"	2"-1"	
63.0 mm (2 1/2 in.)	-	-	-	100	-
50.0 mm (2 in.)	-	-	100	95 – 100	-
37.5 mm (1 1/2 in.)	-	100	90 - 100	35 – 70	-
25.0 mm (1 in.)	100	94 - 100	20 - 55	0 - 15	-
09.0 mm (3/4 in.)	090 – 100	-	0 - 15	-	-
12.5 mm (1/2 in.)	-	25 - 60	-	0 - 5	-
09.5 mm (3/8 in.) 100	20 - 55	-	0 - 5	-	-
05.0 mm (No.4) - 100	0 - 10	0 - 10	-	-	95
02.36 mm (No. 8) 1.18 mm (No. 16) 80	0 - 5	0 - 5	-	-	-
0.60 mm (No. 30)	-	-	-	-	25 - 55
0.30 mm (No. 50)	-	-	-	-	10 - 30
0.15 mm (No. 100)	-	-	-	-	02 - 10



**TABLE II: Gradation of Combined Course and Fine Aggregates for Concrete**

Particle Size Square Openings (Equivalent U.S. Sieve Designation)	Percentage by Weight Passing Sieves Maximum Aggregate Size				
	50mm	37.5mm	25mm	19mm	9.5mm
-					
63.00 mm (2 1/2 in.)	100	-	-	-	-
50.00 mm (2 in.)	90 - 100	100	-	-	-
37.05 mm (1 1/2 in.)	70 - 90	90-100	100	-	-
25.00 mm (1 in.)	50 - 75	50 - 86	90 - 100	100	-
19.00 mm (3/4 in.)	45 - 70	45 - 75	55 - 100	90 -100	-
12.05 mm (1/2 in.)	-	-	-	100	
09.05 mm (3/8 in.)	38 - 55	38 - 55	45 - 75	60 - 80	90 - 100
05.00 mm (No. 4)	30 - 45	30 - 45	35 - 60	40 - 60	50 - 85
02.36 mm (No. 8)	22 - 35	23 - 38	27 - 45	30 - 45	37 - 52
01.18 mm (No. 16)	15 - 27	17 - 33	20 - 35	20 - 35	25 - 40
00.60 mm (No. 30)	10 - 18	10 - 22	12 - 25	13 - 23	15 - 25
00.30 mm (No. 50)	4 - 10	4 - 10	5 - 15	5 - 15	5 - 15
00.15 mm (No. 100)	1 - 3		1 - 3	1 - 5	1 - 5
5					1 -
0.075 mm (No. 200)	0 - 2		0 - 2	0 - 2	0 - 2
0 - 2					

**TABLE III : Quality Tests For Aggregates**

<u>Material</u>	<u>Test</u>	<u>Requirement</u>	<u>Test Designation</u>
Coarse	Abrasion	Loss 40% max.	ASTM C 131
Coarse	Absorption	2.0% max.	ASTM C 127
Coarse	Clay Lumps	1.0% max.	ASTM C 142



Coarse	Surface Coating	0.5% max.	ASTM C 117
Coarse and Fine	Soundness	Loss 10% max.	ASTM C 88
Coarse and Fine	Sieve	As specified	ASTM C 136
Fine	Absorption	4.0% max.	ASTM C 128
Coarse	Cleanness	75% min.	CALIF 227
Fine	Sand equivalent	70% min.	CALIF 217

## 6.8 Concrete for Structures

### 6.8.1 Placing

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

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

6.8.1.2 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.

6.8.1.3 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.

6.8.1.4 The concrete shall be placed as soon after it has been mixed as is practicable. Once the concrete has left in 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 is 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 be discarded.

6.8.1.5 Concrete shall be deposited as nearly as possible in its final position to avoid re-handling. 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.

6.8.1.6 The free fall of concrete shall not be allowed to exceed two metre and where it is necessary for the concrete to be placed more than this depth, it shall not 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 diameter of the pipe shall be not less than 225 mm.

6.8.1.7 Workmen carrying concrete to the site, and all other workmen, shall move only along runways or planks placed for the purpose and no person shall be allowed to walk on the reinforcement.

## 6.8.2 Consolidation

6.8.2.1 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. Only competent workmen shall operate vibrators. Use of vibrators to transport within forms shall not be allowed.

Vibrators shall be inserted and withdrawn at points approximately 450 mm 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.

6.8.2.2 If there is any tendency for the mix to segregate during consolidation, particularly if this produces excessive laitance, 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.



6.8.2.3 Vibrator shall not be allowed to contact the formwork for exposed concrete surfaces.

6.8.2.4 Mechanical vibrators shall be of a type approved by the Engineer to suit particular conditions.

6.8.2.5 Over-vibration or vibration of very wet mixes shall be avoided.

### 6.8.3 Curing and Protection

6.8.3.1 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.

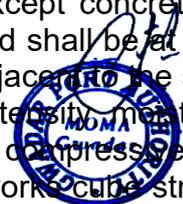
6.8.3.2 For concrete surfaces not in contact with forms, one of the following procedures shall be applied immediately after completion of placement and finishing, as approved by the Engineer.

- Ponding 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 C309.

The compound shall be applied in accordance with the recommendations of the manufacturer. 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.

6.8.3.3 Moisture loss from surface placed against wooden forms or metal forms, and exposed to heating by the sun, shall be minimized by keeping the forms wet until they can be safely removed. After form removal, the concrete shall be cured until the end of the time prescribed as follows by one of the methods specified above.

6.8.3.4 Curing in accordance with sub-clauses above shall be continued for at least 10 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 and to the same intensity, moisture retention measures may be terminated when the average compressive strength has reached 70 percent of the minimum specified work cube strength. If one



of the first four curing procedures specified above is used initially, it may be replaced by one of the other specified procedures any time after the concrete is one day old provided the concrete is not permitted to become surface dry during the transition.

- 6.8.3.5 When the mean daily outdoor temperature is less than 5°C (41°F), temperature of the concrete shall be maintained between 10°C to 20°C (50°F-68°F) for the required curing period specified above.

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 with measures to avoid 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 gasses, which contain carbon dioxide.

- 6.8.3.6 When necessary, provision for wind-breaks, shading, spraying, sprinkling, ponding or wet covering with a light coloured 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.

- 6.8.3.7 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 3°C (37.4°F) in any one hour or 10°C (30°F) in any 24 hour period.

- 6.8.3.8 Concrete shall be protected from damaging mechanical disturbances, such as load stresses, heavy shock and excessive vibrations, during the curing period. 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.

#### 6.8.4 Works in Extreme Weather

- 6.8.4.1 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.

- 6.8.4.2 When the temperature of the surrounding air is expected to be below 5°C (41°F) during placing or within 24 hours thereafter, the temperature of the plastic concrete, as placed, shall be no lower than 13°C (55.4°F) for sections less than 300 mm in any dimensions nor 10°C (50°F) for any other sections.

When necessary, concrete material should be heated before mixing and carefully protected after placing. In general, heating a mixing water alone



to about 60°C (140°F) may be sufficient for this purpose. Calcium chloride up to a maximum of 1-1/2 percent of the weight of cement may be used to accelerate the rate of hardening only with prior written permission of the Engineer. Use of calcium chloride in excess of 1-1/2 percent is harmful. No frozen material or concrete damaged by frost shall be removed. It is recommended that concrete exposed to the action of freezing weather should have entrained air and the water content of the mix should not exceed 25 litres per bag of cement.

If water or aggregate is heated above 38°C (100°F), the water shall be combined with the aggregate in the mixer before cement is added. Cement shall not be mixed with water or with mixtures of water and aggregate having a temperature greater than 38°C (100°F).

6.8.4.3 During hot weather, the temperature of the concrete as placed shall not be so high as to cause difficulty from loss of slump, flash set, or cold joints and should not exceed 32°C (90°F). For mass concreting, this temperature should not exceed 21°C (70°F). When the temperature of the concrete exceeds 32°C (90°F), precautionary measures approved by the Engineer shall be put into effect. When the temperature of the steel is greater than 50°C (122°F), steel forms and reinforcement shall be sprayed with water just prior to placing the concrete. The ingredients shall be cooled before mixing, or ice flakes, or well crushed ice 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 Standard 305 shall also be adopted.

#### 6.8.5 Construction Joints

6.8.5.1 Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be approved by the Engineer.

6.8.5.2 Joints not shown on the drawings shall be so made and located as to least impair the strength of the structures 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 be at the underside of floor slabs or beams, and at the top of footings or floor slabs. Beams, brackets, column capitals, haunches and drop panels shall be placed at the same time as slabs. Joints shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

6.8.5.3 Reinforcing steel shall continue across the joints. Key and inclined dowels shall be provided as, and where directed by Engineer. Longitudinal keys at least 40mm (1-1/2") deep shall be provided in all joints in walls and between walls and slabs or footings.



- 6.8.5.4 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.
- 6.8.5.5 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 un-exposed walls and all others not mentioned herein shall be dampened (but not saturated) immediately prior to placing of fresh concrete.
- 6.8.5.6 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 12 mm thick on horizontal surfaces. The fresh concrete shall be placed before the grout has attained initial set.
- 6.8.5.7 When the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle, and brushed, care being taken to avoid dislodgement 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 150 mm in thickness, and shall be well rammed against old work, particular attention being paid to corners and closed spots.
- 6.8.5.8 Stop ends for movement joints or construction joints shall be made by splitting them along the lines of reinforcement passing through them, so that each portion can be positioned and removed separately without disturbance or shock to the reinforcement or the concrete. Stop ends made of expanded metal or similar material may only be left permanently in the concrete with prior written approval of the Engineer. Where such stop ends are used, no metal may be left permanently in the concrete closer to the surface of the concrete than the specified cover to the reinforcement. Wood strips inserted for architectural treatment shall be kerfed to permit swelling without pressure on the concrete.

#### 6.8.7 Expansion Joints

Expansion joints shall be provided wherever indicated on the Drawings or as directed by the Engineer. In no case shall the reinforcement, 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/or as directed by the Engineer. All materials for use in the expansion joints shall have, prior approval of the Engineer before placing order for supply.



## 6.8.8 Embedded Items

- 6.8.8.1 Sleeves, inserts, anchors, and embedded items required for adjoining work or for its support shall be placed prior to concreting.

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.

- 6.8.8.2 All embedded items shall be positioned accurately and supported against displacement. Voids in sleeves, inserts, and anchor slots shall be filled temporarily with approved readily removable material to prevent the entry of concrete into the voids.

## 7.0 FINISHING OF FORMED SURFACES

### 7.1 General

- 7.1.1 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.
- 7.1.2 When finishing is required to match a small sample furnished to the Contractor, the sample finish shall be reproduced on an area at least 10 square metres (100 Sq.ft.) in an inconspicuous location Designated by the Engineer before proceeding with the finish in the specified location.
- 7.1.3 Allowable deviations from plumb or level and from the alignment, profile grades, and dimensions are specified in Clause 9. Tolerances for concrete construction defined as 'tolerances', are 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 informed 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 sheathing or lining or sections, or otherwise defective form lumber will be considered as abrupt irregularities, and will be tested by direct measurements. All other irregularities will be considered as gradual irregularities, and will be tested by use of a template, consisting of a straight edge or the equivalent thereof for curved surfaces. The length of the template will be 2 metres (6 ft.) for testing of formed surfaces and 3 metres (10 feet) for testing of unformed surfaces.



## 7.2 As-cast Finishes

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

### 7.2.1 Rough form finish:

No selected form facing materials shall be specified for rough form finish surfaces. The holes and defects shall be patched. Fins exceeding 5 mm (1/4") in height shall be chipped off or rubbed off. Otherwise, surfaces shall be left with the texture imparted by the forms.

### 7.2.2 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 view. Location of surfaces of concrete structures requiring fair face finish are shown in the Drawings. Surface irregularities, measured as described in sub-clause 7.2.1, 'Rough form finish', shall not exceed 5 mm (1/4") for gradual irregularities and 2.5 mm (1/8") for abrupt irregularities, except that abrupt irregularities will not be permitted at construction joints. Abrupt irregularities at construction joints and elsewhere in excess of 2.5 mm (1/8") and gradual irregularities in excess of 5 mm (1/4") shall be reduced by grinding so as to conform to the specified limits. Abrupt irregularities at construction joints shall be ground on 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, 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.



## 8.0 REPAIR OF DEFECTS

### 8.1 General

8.1.1 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 replace at the Contractor's expense.

8.1.2 All ties, bolt holes, and all repairable defective areas shall be patched immediately after form removal.

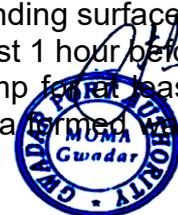
### 8.2 Repair of Defective Areas

8.2.1 Defective and honeycombed concrete shall be removed down to sound concrete. The area to be patched and an area at least 150 mm (6") 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 No.25 BS Sieve and shall then be well brushed into the surface.

8.2.2 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 less than 1 part cement to 2-1/2 parts sand by weight. White Portland cement shall be substituted for a part of the gray Portland cement on exposed concrete in order to produce a colour matching the color of the surrounding concrete, as determined by a trial patch.

8.2.3 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.

8.2.4 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 at least 7 days. Metal tools shall not be used in finishing a patch in a formed wall, which will be exposed.



8.2.5 Whereas-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 0.2 square metre in each 100 square metres of as-cast surface. This is in addition to form tie patches, if the project design permits ties to fall within as-cast areas.

8.2.6 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.

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

### 8.3 Tie and Bolt Holes

After being cleaned and thoroughly dampened, the tie and bolt holes shall be filled solid with patching mortar. If architectural appearance requires, these holes may be filled partially creating the desired round clear holes pattern on surfaces exposed to view.

### 8.4 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.

## 9.0 CONCRETE CONSTRUCTION TOLERANCES

All tolerances shall be as per ACI 317.

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 forms so as to ensure complete work within tolerance limits. These allowable tolerances shall not relieve the Contractor of his responsibility for correct fitting of indicated materials and components. These tolerances are not cumulative.

9.1 Variation from the plumb (or the specified batter for inclined walls). (allowable variation)

9.1.1 In the lines and surfaces of columns and walls, and in arises

In any 3 metres (10') of length or height

Maximum for the entire length or height  
(1")

6 mm (1/4")

25 mm



9.1.2 For exposed corner columns, control joint grooves and other conspicuous lines

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

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

In beam soffits, and in arises measured before removal of supporting shores.

In any 3 metres (10') of length	6 mm (1/4")
In any bay or in any 6 metres (20') maximum	10 mm (3/8")
Maximum for the entire length (3/4")	19 mm

9.3 Variation of the linear structure lines from established position in plan and related position of columns and walls.

In any bay or 6 metres (10')	$\pm 13$ mm ( $\pm 1/2$ ")
Maximum for the entire length	$\pm 25$ mm ( $\pm 1$ ")

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

Up to 12" (300mm)	- 6 mm (-1/4")
	+10 mm (+3/8")
More than 12" (300mm)	- 10 mm (-3/8")
	+13 mm (+1/2")

9.5 **Footings**

9.5.1 Variation in dimensions in plan - 13mm (-1/2")

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

+ 50mm (+2")

9.5.2 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).

+ 50mm



### 9.5.3 Reduction in thickness

Minus 5 percent of specified thickness - 5%

## 10.0 ACCEPTANCE OF STRUCTURE

### 10.1 General

10.1.1 Completed concrete work, which meets all applicable requirements will be accepted subject to the other terms of the Contract Documents.

10.1.2 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.

10.1.3 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.

### 10.2 Dimensional Tolerances

10.2.1 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 10.4.

10.2.2 Formed surfaces resulting in concrete outlines larger than permitted by the tolerances 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.

10.2.3 Concrete members cast in the wrong location may be rejected if the strength, appearance or function of the structure is adversely affected as decided by the Engineer or if misplaced items interfere with other construction.

10.2.4 Inaccurately formed concrete surfaces exceeding the limits of Clause 9 or of Clause 5.5 of Section 'Formwork' shall be removed and replaced, and those that are exposed to view, may be rejected, or shall be repaired, or removed and replaced, as directed by the Engineer.

### 10.3 Appearance



10.3.1 Architectural concrete with surface defects exceeding the limitations described in relevant Clauses of this section shall be removed and replaced.

10.3.2 Other concrete exposed to view with defects which adversely affect the appearance of the specified finish may be repaired only by approved methods.

10.3.3 Concrete not exposed to view is not subject to rejection for reason of defective appearance.

#### 10.4 **Strength of Structure**

10.4.1 Strength of the structure in place will be considered potentially deficient if it fails to comply with any requirement which is relevant to 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 specified under section 'Reinforcement' 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, premature removal of formwork, likely to result in deficient strength.
- Poor workmanship likely to result in deficient strength.

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

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

10.4.4 If core tests are inconclusive or impractical to obtain or if structural computations do not confirm the safety of the structure, load tests may be required and their results evaluated, in accordance with ACI Standard 318.

10.4.5 Concrete work judged inadequate by structural computations 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.

10.4.6 The Contractor shall bear all costs incurred in providing the additional testing and/or computations required by this section.

#### 11.0 **MEASUREMENT AND PAYMENT**



## 11.1 General

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

11.1.1 All types of formwork.

11.1.2 All types of expansion, construction and contraction joints including joint fillers, sealant, caps & grease.

11.1.3 All sampling, mixing and testing as specified.

11.1.4 Concrete mix design.

11.1.5 Vapour barrier.

11.1.6 Impervious sheeting, burlap covering, liquid membranes compound, additives, non-shrink grout, epoxy resins and water stops.

11.1.7 Anchor bolts and other embedded parts.

11.1.8 All submittals including shop drawings, co-ordination drawings etc.

11.1.9 Repair and replacement of defective work.

11.1.10 Surface texture, skid resistant surfaces & surface test.

11.1.11 Curing

11.1.12 Installation / fixing in position of all precast / prefabricated concrete elements, as shown on drawings.

11.1.13 Tie bars, dowel bars, dowel bar sleeves and welded wire mesh.

11.1.14 Providing and laying Duracrete fiber or equivalent as specified.

## 11.2 Plain and Reinforced Concrete (Except Railing)

### 11.2.1 Measurement

Measurement of acceptably completed works of plain and reinforced concrete will be made on the basis of number of cubic metres of concrete actually provided, placed, consolidated, finished, cured in position, complete as shown on drawings or as directed by the Engineer.



### 11.2.2 Payment

Payment will be made for acceptable measured quantity of plain and reinforced concrete on the basis of unit rate per cubic metre quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## 11.3 Railing

### 11.3.1 Measurement

Measurement of acceptably completed works of railing will be made on the basis of number of running metres of railing actually provided, placed, consolidated, finished, cured in position as shown on drawings or as directed by the Engineer.

### 11.3.2 Payment

Payment will be made for acceptable measured quantity of railing on the basis of unit rate per running meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## 11.4 Pre-Cast Concrete Panel Cladding

### 11.4.1 Measurement

Measurement of acceptably completed works of Pre-Cast Concrete Panel Cladding will be made on the basis of actual area in square meter of panel cladding provided and placed in position as shown on drawings or as directed by the Engineer.

### 11.4.2 Payment

Payment will be made for the acceptable measured quantity of Pre-Cast Concrete Panel Cladding on the basis of unit rate per square meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## 11.5 Pre-Cast Concrete Coping

### 11.5.1 Measurement

Measurement of acceptably completed works of Pre-Cast Concrete Coping will be made on the basis of actual length in running meter of Coping provided and placed in position as shown on drawings or as directed by the Engineer.

### 11.5.2 Payment

Payment will be made for the acceptable measured quantity of Pre-Cast Concrete Coping on the basis of unit rate per running meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.



## 11.6 Water Stopper

### 11.6.1 Measurement

Measurement of acceptably completed works of Water Stopper will be made on the basis of actual length in running meter of water stopper provided and placed in position as shown on drawings or as directed by the Engineer.

### 11.6.2 Payment

Payment will be made for the acceptable measured quantity of Water Stopper on the basis of unit rate per running meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

## CEMENT CONCRETE BLOCK MASONRY

### 1. SCOPE

The work under this section of the specifications consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in any floor and at any height in connection with the supply and installation of ordinary cement concrete solid and hollow block masonry work including wall ties, anchors, damp-proof courses, complete in strict accordance with this section of the Specifications and applicable drawings, and subject to the terms and conditions of the Contract.

### 2. APPLICABLE STANDARDS

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

#### 2.1 Pakistan Standards

- 232 Ordinary Portland Cement.
- 419 Properties & Specifications of blocks

#### 2.2 ISO (International Standardisation Organisation)

- R.679 Method of testing strength of cement compressive and flexural strengths of plastic mortar.
- R.680 Chemical analysis of cements - Main constituents of Portland Cement.
- R.681 Chemical analysis of cement - Main constituents of Portland



Cement.

### 2.3 **ASTM (American Society for Testing and Material)**

- C.90 Solid/Hollow Load bearing Concrete Masonry units.
- C.129 Solid/Hollow non-Load bearing Concrete Masonry units.
- C.140 Sampling and Testing of Concrete Masonry Unit.
- C.144 Aggregate for Masonry Mortar.
- C.145 Solid load bearing concrete masonry units.
- C.149 Bond Strength of Mortar to Masonry Units.
- C.150 Portland cement.
- C.270 Mortar for Unit Masonry.
- C.331 Light weight Aggregate for Concrete Masonry Units.
- C.404 Aggregates for Masonry Grout.
- C.426 Drying Shrinkage of Concrete Block.
- C.476 Mortar and Grout for Reinforcement Masonry.

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

- 743 Materials for Damp-proof Courses.
- 1243 Specification for Metal Ties for Cavity wall Construction.
- 3148 Tests for water for making concrete.
- 4887 Mortar Plasticiser
- 121 Pt-1 Brick and Block Masonry
- 122 Pt-2 Walls and Partitions of Blocks and Slabs.

### 2.5 **ACI (American Concrete Institute)**

- ACI.530 Building code requirement for masonry structures.
- ACI.531 Specifications for Concrete masonry structures

## 3. **PRODUCT, DELIVERY, STORAGE AND HANDLING**

- 3.1 Deliver concrete masonry units stacked on pallets.



- 3.2 Store units above ground level platform allowing air circulation under stacked units. Cover and protect units against wetting prior to use.
- 3.3 Handle units on pallets of flat bed barrows. Do not permit free discharge from coveyor unit or transporting in mortar trays.

**4. MATERIALS**

**4.1 For Block**

Cement, aggregates and water for concrete blocks shall conform to the requirements as specified in the section for Plain and Reinforced Concrete.

**4.2 For Mortar**

**4.2.1 Sand**

Sand for mortar shall comply with the requirements for BS- 1200. It shall be graded in accordance with the following table and the various sizes of particles shall be uniformly distributed. Sand that has been in contact with seawater shall not be used unless it has been thoroughly washed to the satisfaction of the Engineer.

Sieve Size (No.)	Percent Passing by weight	
	min.	max.
# 4	100	-
# 8	95	-
# 16	70	100
# 30	40	75
# 50	10	35
#100	2	15
#200	0	0

Sand upto .0025 inch shall not be more than 8% by weight of the total.

**4.2.2 Cement:**

Cement shall be Ordinary Portland Cement conforming to BS-12.



#### 4.2.3 **Water:**

Water shall be clean and free from any harmful impurity. Where the quality of the water is doubtful, it shall be tested in accordance with BS-3148.

#### 4.2.4 **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.

#### 4.2.5 **Mortars and Grout:**

Materials for mortar, sand binding agent and water, shall be mixed by volume or by weight 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 shall be as strong, but no stronger than the materials it bonds together: 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.

#### 4.2.6 **Reinforcement and Anchors:**

For reinforcement refer specification section no. 2200.

### 5. **CONCRETE BLOCK MAKING**

- 5.1 The Solid and Hollow blocks shall be machine moulded. The block making machines shall be of the standard approved by the Engineer. They shall be operated according to the instructions laid down by the manufacturers.
- 5.2 The blocks shall be continuously water cured by sprinkling water for a minimum of 10 days and covered between sprinkling operations with 4 mils thick polyethylene sheeting. After 10 days water curing period, the blocks shall be air-dried. Under no circumstances will blocks be used in the work until they are completely dry. During curing period no surfaces of the block will be allowed to dry.
- 5.3 Cured concrete blocks shall be stored off the ground, stacked on level platforms which allow air circulation under stacked units. Units shall be covered and protected against wetting.
- 5.4 Care shall be exercised in the handling of all concrete blocks. No damaged blocks shall be used in the work.



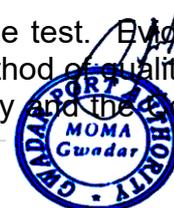
- 5.5 The hollow blocks shall be manufactured as per pattern shown on the drawing. These block units shall be provided by the Contractor for use where required in building structures from approved type of materials. Units shall have uniformly fine smooth surfaces of uniform colour. These shall be free of any honey combing or other imperfections or deformations, all edges true and straight, and at right angles with each other and without any chipped or otherwise broken edges.
- 5.6 The blocks cast on different dates shall be stacked separately and must be labelled showing the date on which they were cast.
- 5.7 Reinforced cement concrete hollow block masonry shall be provided where shown on the drawings. Hollow block manufactured by moulding machine shall have well formed cavities, sharp and well defined edges and corners, smooth surfaces without any imperfections or deformations.

## 6. PROPERTIES OF BLOCKS

- 6.1 All blocks shall be of the size and shape required to complete the work shown in the Drawings or as instructed by the Engineer.
- 6.2 The cement, sand and coarse aggregate shall be volume batched and their proportion may be adjusted so as to provide the concrete of the required strength when tested and shall be mixed in a concrete mixer in accordance with Sub-Clause 5.4 of the section 'Plain and Reinforced Concrete'.
- 6.3 All blocks shall comply with ASTM latest edition. The compressive strength of various solid and hollow block, shall be as follows:

S.No.	Type of Concrete Masonry ASTM of 3 Units	Compressive Strength Psi (MPa)		Location	latest Edition
		Average Unit	Individual		
1.	Solid/Hollow load bearing masonry units ( ASTM-C-90)	1900 (13.1)	1700 (11.7)	Exposed to frost action, weather & moisture.	
2.	Solid/Hollow non bearing masonry units (ASTM-C-129)	600(4.14)	500 (3.45)	Partitions walls not exposed to moisture and Boundry walls.	Load

- 6.4 The Contractor shall provide test certificates providing the average minimum crushing strength of the blocks prior to the commencement of the construction. Further test certificates shall be provided as required by the Engineer, to ensure that all batches of blocks have the minimum specified crushing strength.
- 6.5 A laboratory approved by the Engineer shall carry out the test. Evidence shall be produced that the block manufacturer has an efficient method of quality control. The Engineer will require to test samples of blocks periodically and the contractor shall



make necessary arrangements accordingly. The method of sampling for all tests shall be in accordance with.

6.6 All properties or specifications of blocks, not explained in these Specifications shall comply with the requirements of ASTM 1988 edition as directed by the Engineer.

## 7. SUCTION RATE

The Contractor shall, at his own cost, satisfy the Engineer that the suction rate of the block when determined in accordance with Appendix "A" of BS 3921 does not exceed 20 g/dm<sup>2</sup>/min. or that the Contractor is able to adjust it so that it does not exceed this value on site.

## 8. SOLUBLE SALT CONTENT

For exposed blockwork, the contents by weight percent of soluble sulphate, calcium, magnesium, potassium and sodium radicals, shall not exceed 0.30, 0.10, 0.30, 0.03 and 0.03, percent respectively when ascertained in accordance with BS 3921, at the cost of the Contractor.

## 9. REINFORCING AND ANCHORS OF BLOCK MASONRY

Unless otherwise stated reinforcing and anchors shall conform to undermentioned sizes:

### 9.1 For Hollow Blocks

Two # 3 bars shall be provided at every third course for anchoring of block masonry to columns. 1 # 3 bar, shall be provided for anchoring masonry walls to plinth beams/floor beam, as shown on the drawings.

### 9.2 For Solid Block

Two # 3 bar shall be provided at every sixth course for anchoring of block masonry to columns. One # 3 bars at every fifth block length shall be provided for anchoring masonry walls to plinth beam / floor beam, as shown on the drawings.

9.3 Dovetail anchors and slots (if used as an alternate anchorage) shall be not less than 18 gauge galvanized steel.

## 10. ERECTION

10.1 Blocks shall be laid true to line, level and laid in accurately spaced courses in stretcher bond with vertical joints of each course located at centre of units in alternate courses below. Vertical joints shall be buttered in the entire height of blocks. Each course shall be bonded at corners and at intersections of walls and shall be properly bonded. Courses of block shall be kept plumb throughout and corner reveals shall be true and in plumb.



Standard width of mortar joints for both horizontal and vertical joints shall be 10mm (maximum). Mortar joints in walls shall have full mortar coverage on vertical and horizontal faces between the blocks. Mortar joints on wall including struck joints, shall be thoroughly compacted and pressed tight against the edges of the blocks with proper tools. Blocks terminating against soffits of beam or slab construction shall be wedged tight with wedges and the joints shall be packed solidly with mortar between the top of the block and the bottom of slab or beam. Control expansion joints shall be kept free from mortar or other debris.

Unless otherwise shown on the drawings or specified by the Engineer, the spaces around doorframes and other material or built in items shall be solidly filled with mortar. Spaces around the door and window holdfasts shall be filled in with Class 'C' concrete. Work required to be built in with masonry including doorframe anchors, wall plugs, and dovetail anchors and accessories shall be built in as the erection progresses.

10.2 The block work shall be carried up in a uniform manner and no portion shall be carried more than one metre above the adjoining one at any time. All masonry shall be kept strictly true and square and the whole properly bonded together and levelled round each floor.

10.3 Sleeves, Chases, holes, sinking and mortices for other trades shall be correctly located and formed to the sizes as required by the relevant trades. Chiselling of completed walls or the formation of holes shall only be carried out with the approval of the Engineer.

10.4 Walls of blocks indicated, as being non-load bearing shall be constructed on the insitu concrete floor slab unit after the floor formwork is struck and the concrete has obtained sufficient strength to support their weight. Tothing into load-bearing walls shall not be permitted.

10.5 All bolts, anchors, ties, pipe sleeves, flushing metal attachments, lintels and the like required to be built into the work shall be correctly inserted and executed as the work proceeds.

Walls or partitions abutting concrete columns or walls shall be securely anchored and tied with metal anchors or ties at not more than 450mm vertical centres. Wall ties cast in with concrete shall be bent down after the removal of formwork and shall be securely jointed into the mortar beds of walling.

10.6 Care shall be taken during construction of cavity walls so as to avoid the filling up of cavity with mortar. G.I. flashing and weep holes shall be provided wherever specified on the drawings or as per the instructions of the Engineer. Weep holes will be formed by oiled rods, removed after the mortar is set, at specified locations.

## 11. 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 been 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.



## 12. JOINTING

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

12.1 Exterior exposed joints shall be tightly formed to a weather joint with the point of the trowel.

12.2 Interior / exposed joints shall be tightly formed to a concave joint.

12.3 Joints which are subsequently covered with plaster or other finish materials shall be struck flush.

## 13. TOLERANCES

All block work shall be erected plumb and true to line and level with the maximum variation in any storey height or any length of wall being one mm in one metre. The maximum tolerance in the length, height or width of any single masonry unit shall be + 3mm.

## 14. DAMP PROOF COURSE

Damp-proof course shall be laid on an even mortar bed, free from projections, which may puncture the material. Where the damp-proof course is to be stepped, only flexible membrane shall be used. All damp proof course, unless otherwise specified, shall consist of class 'C' cement concrete 50mm thick, mixed with 2.5 kg. of pudlo per bag of cement or other approved quality water proofing compound as per manufacturer's specifications and shall be laid at required levels as per drawings and instructions of the Engineer. The D.P.C shall be tamped consolidated, levelled, edges and corners made to the requirements of concerned drawings including finishing and curing complete.

## 15. SOLID BLOCK WORK AROUND OPENING OF HOLLOW MASONRY

Around all openings in hollow block masonry, the Contractor shall provide solid block work of same thickness as that of hollow block masonry wall and of width as indicated on the Drawings. Solid block shall be laid around openings in such a manner that these are bonded integrally with hollow block masonry.

## 16. REINFORCED HOLLOW BLOCK MASONRY

Where specified on the Drawings, reinforced hollow block masonry shall be provided. Horizontal and vertical reinforcement shall be deformed, hot rolled billet steel bar. Two # 3 bars shall be provided at 600mm centers. While the vertical reinforcement shall be one # 3 bar at 800mm centers. Bars shall be anchored and held firmly in respective beams and columns in the manner shown in Drawings. The reinforced hollow part of the block wall shall be solidly filled with Class 'D' concrete at intervals of one-meter maximum height as the laying of block masonry work proceeds. The filled concrete shall be consolidated thoroughly by rodding to avoid formation of voids. Contractor shall submit shop drawings of anchoring and placing of reinforcement in hollow block masonry for approval of the Engineer.

## 17. CURING AND REPAIRS



17.1 All block masonry shall be water cured and shall be kept wet for at least seven days, by an approved method, which will keep all surfaces to be cured continuously wet. Water used for curing shall meet the requirements of the specifications for water used in the manufacture of blocks.

17.2 If, after the completion of any block masonry, the work is not in alignment or level, or does not, conform to the lines and grades shown on the Drawings or shows a defective surface, it shall be removed and replaced by the Contractor at his expense unless the Engineer grants permission, in writing, to patch or replace the defective area.

## 18. MASONRY SHORT OF HEIGHT

In case of different thickness of slab in different areas or rooms or for any other reasons, whatsoever if chiseling of masonry is required, the Contractor shall do so at his own cost. Where for any reason whatsoever, the height of the wall is short of ceiling height, the actual height shall be made good with Class 'C' nominal mix concrete. This concrete shall neither be measured nor be paid under item of concrete but will be paid for under the item of masonry. Similarly, where the lintel heights are such that the Contractor has to chisel the masonry or provide cast-in-place concrete to make up the height of the course, no payment will be made for chiseling, but where such cast-in-place concrete is provided, payment for the same will be made at the unit rate of masonry.

## 19. MEASUREMENT AND PAYMENT

### 19.1 General

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

19.1.1 Chiseling of masonry, wherever required.

19.1.2 Providing and fixing all joint reinforcing bars and dovetail anchors.

19.1.3 Cement sand mortar used in laying blocks, curing of masonry works and making of weep holes.

19.1.4 Providing and filling Class 'D' Concrete in the cavity of hollow block masonry.

19.1.5 Providing and laying damp proof courses including damp proof materials and GI sheet flashing within cavity wall.

19.1.6 Providing and forming all types of joints, pointing etc.

19.1.7 Reinforcing Steel



## 19.2 Block Masonry

### 19.2.1 Measurement:

Measurement for acceptably completed works of respective type of block masonry will be made on the basis of actual volume in cubic meter of masonry provided and installed in position as shown on the drawings or as directed by the Engineer. Each measurement shall be taken to the nearest 12mm. All openings left in the masonry wall shall be deducted.

### 19.2.2 Payment:

Payment will be made for acceptable measured quantity of respective type of block masonry work on the basis of unit rate per cubic meter quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.



## CEMENT PLASTER

### 1. SCOPE

The work under this section of the Specifications consists of furnishing all plant, labour, equipment, appliances, and materials and in performing all operations in any floor and at any height connection with providing and installation of cement plaster, and specified external rendering complete in strict accordance with this section of the Specifications and the applicable drawings and subject to the terms and conditions of the Contract.

### 2. GENERAL

- 2.1 Except as may be otherwise shown on surfaces specified, all plaster work, both internal and external shall be ordinary Portland Cement plaster of the required thickness as shown on the drawings.
- 2.2 Plastering shall not commence until all electric conduits, drainage and sanitary pipes, inlets to tanks, brackets, clamps, doors and window frames and all 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.
- 2.3 Sample of materials shall be submitted to the Engineer for his approval prior to use in the works.

### 3. MATERIAL

- 3.1 Cement for plaster shall be Ordinary Portland Cement (B.S 12 or P.S 232) or Sulphate resisting cement (B.S 4027 or P.S. 612) as specified and shall conform to requirements specified in the section "Plain and Reinforced Concrete".
- 3.2 Sand for plaster shall comply with the requirements of BS 1199, BS 1200 or the draft Pakistan Standard "Sand for Plaster" as directed by the Engineer.
- 3.3 Water for plaster shall conform to requirements specified in the section for "plain and reinforced concrete".
- 3.4 All materials and workmanship for plaster, not explained in these Specifications, shall comply with the requirements of relevant BS CP 211 and CP 221 as directed by the Engineer.

### 4. PROPORTIONING AND MIXING

- 4.1 Measurement of materials by volume shall be by containers of known capacity to maintain consistent proportions. No lumpy or caked material shall be used. Mixing equipment boxes and tools shall be clean. Materials shall be proportioned as specified on the Drawings, in the Bill of Quantities or as directed by the Engineer. Mixing shall be continuous until all ingredients are evenly distributed and thoroughly mixed.
- 4.2 Only limited water shall be added for proper workability and such quantity of 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.
- 4.3 Plaster ingredients shall be thoroughly mixed either by hand on a clean cement concrete platform or by a mechanical mixer, as directed by the Engineer.



## 5. PREPARATION OF SURFACE TO BE PLASTERED

- 5.1 Concrete surface to be plastered shall be cleaned to remove all grease, form oil and other surface impurities, which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface of all-concrete ceilings, beams and columns shall be lightly hacked by approved means to give the required key for plastering.
- 5.2 All masonry surfaces to be plastered shall be cleaned to remove all matter, which will otherwise adversely affect the adhesion of plaster to the surface concerned. The surface shall be washed with clean water and kept damp for 24 hours before further treatment. The surface thus prepared shall be treated uniformly with cement and sand slurry. The slurry to be used shall be one part cement to one part sand by volume with water added to make a stiff creamy mix. The slurry shall be applied with a stiff brush on surface, which has previously been well wetted. The surface so treated shall be left to cure for 3 days.

## 6. APPLICATION OF PLASTER

- 6.1 The plaster of thickness less than the specified thickness shall be rejected. If the plaster is to be more than 1/2" thick, it shall be done in two coats. The surface of first coat shall be made rough before the second coat is applied.

The plaster shall not have wavy surface and shall be perfectly in plumb. The edges and corners shall represent a straight line. The plaster shall be kept wet continuously for at least ten (10) days. No extra payment shall be allowed for jambs, junctions, corners, edges, round surfaces or for more than one layer of plaster required due to any unevenness in the work done by the Contractor. The plasterwork is to cover all conduits, pipes etc fixed in the walls and ceiling. Wherever specified, metal lath shall be nailed firmly before plastering is commenced. The plaster surface shall be tested frequently with a 10-meter straight edge and plumb bob.

- 6.2 Plaster containing cracks, blisters, pits, discoloration or any defects shall not be acceptable. Any such plaster or loose plaster shall be removed & replaced with plaster in conformity with these specifications and as additionally directed by the Engineer.

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.

## 7. METAL LATH

Metal lathing shall be fabricated from sheet steel and shall be of uniform quality and free from flaws broken strands, cracks and corrosive pitting, shall be rectangular and true to shape and shall comply with BS-1369.

All lathing shall be galvanized. Where plastering material depends entirely on the lathing for its key, these shall be not less than two complete mesh openings per 1-1/8" in one direction and the width of the aperture shall not be less than 3/16".

Sheets shall not be less than 1.6 kg/sq.m when fabricated, using 0.7 mm thick steel sheet. Where used on smooth surfaces to form a key it shall be not less than 1.2 kg/sq.m when fabricated, using 0.5 mm thick steel sheet. Tying wire shall be 1.2 mm diameter galvanized annealed iron wire.

Sheets shall be welded to angle iron frame as shown on drawings.

## 8. ANGLE AND BEADS



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

All angle beads, stop beads, depth gauge beads and the like are to be fixed in accordance with the manufacturer's instructions, at all corners, stops, joints, etc. as per directions of Engineer In-charge.

## **9. INTERNAL/EXTERNAL PLASTER**

9.1 Where specified in the Drawings external surface shall have an average 1/2" thick plaster finish, consisting of a base coat of 1:4 cement sand mortar in Grey cement and the finish coat of smooth plaster as shown on the Drawings and as directed by the Engineer.

9.2 Where specified in the Drawings all internal plaster shall have an average 1/2" thick consisting of base coat of 1:3/1:4 cement sand mortar in grey cement and finish coat of smooth plaster as shown on the Drawings and as directed by the Engineer.

9.3 Stucco Plaster

Wherever specified in the drawings external stucco plaster shall consist of 1:2, one-part white cement & 2 parts approved shade of marble chips zero size mixed with approved pigment to achieve desired shade. Wherever shown on drawings, groves shall be provided with aluminum U/Y channels. The contractor shall prepare mockup samples of stucco plaster for the approval of Engineer. The plaster shall be applied with machines and the final rough surface/texture/shade shall be as per the approved sample, direction and approval of the Engineer-In charge.

## **10. CLEANING AND PROTECTION**

10.1 Rubbish and debris shall be removed as necessary to make way for work of other trades and as directed by the Engineer. As each room or space is completed all rubbish, debris, scaffolding and tools should be removed to leave the room clean.

10.2 Prior to plastering all aluminum windows, finished metals should be covered by sheet of plastic or tarpaulin to protect it from damage.

10.3 Protect finished plaster from injury by any source. Contractor shall also protect walls, floors and work of other trades from plaster materials.

## **11. TOLERANCES**

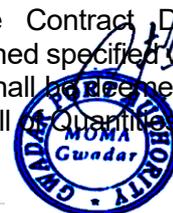
Surfaces of plaster work shall be finished with a true plane to correct line and level with all angle and corners to a right angle unless otherwise specified and with walls and reveals plumb and square.

Maximum permitted tolerances shall not exceed 1/8" in 6-meter variation from plumb or level in any exposed line or surface and 1/16" variation between planes of abutting edges or ends.

## **12. MEASUREMENT AND PAYMENT**

12.1 General

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



The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under this specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

- 12.1.1 Metal lath over reinforced concrete and masonry joint.
- 12.1.2 Joints, junctions, corners, beads, drip course edge, roundings, and aluminum U/Y channels in groves. Etc.
- 12.1.3 More than one layer due to any unevenness in the finished works and base coat plaster in stucco plaster including marble chips/colour pigments.
- 12.1.4 Cutting & patching of all defective works.
- 12.1.5 Surface preparation, cleaning and protection as specified.  
Marble chips & pigments in stucco plaster.
- 12.1.6 Roughening of first coat of plaster before application of 2<sup>nd</sup> coat incase where overall required plaster thickness exceeds ½ inch.

## 12.2 Plain Plaster/Stucco plaster

### 12.2.1 Measurement

Deductions shall not be made for ends of joints, beam posts, etc., and openings not exceeding 5 square meter each and no addition shall be made for reveals, jambs, soffits, sills, etc. of these openings non for finishing the plaster around ends of joints, beams posts, etc.

In case of opening of area exceeding 5 square meter each, deduction shall be made for the openings and also no addition shall be made for reveals jambs, soffits, sills, etc., of these openings.

Measurement of acceptably completed works of plaster will be made on the basis of number of square meters of the surface area plaster as shown on the Drawings, or as directed by the Engineer.

### 12.2.2 Payment

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



## FLOOR AND WALL FINISHES

### 1. SCOPE

The work under this section of the Specification consists of furnishing all plant, labour, equipment, appliances and materials and performing all operations in any floor, wall, counter and at any height in connection with the installation of cement concrete floors and floor finishes including bases, skirting and external surface treatments, complete in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract.

### 2. MATERIAL

#### 2.1 Cement

Cement shall be ordinary Portland cement conforming to B.S. 12 or PS 232.

#### 2.2 Sand

All fine sand shall be obtained from sources approved by the Engineer. The grading shall conform to B.S 882 Grading Zone 1 and 2 of which the gradation limits are as follows:

Percentage (by weight) passing		
B.S. Sieve	Grading Zone 1	Grading Zone 2
3/8" (9.53 mm)	100	100
3/16" (4.765 mm)	90-100	90-100
No. 7	60-95	75-100
No. 14	30-70	55-90
No. 25	15-34	35-59
No. 52	5-20	8-30
No. 100	0-10	0-10

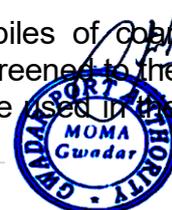
#### 2.3 Coarse Aggregate

Coarse aggregate shall be crushed or uncrushed gravel or crushed stone, angular or rounded in shape and shall have granular, crystalline or smooth surface free from friable, flaky and laminated pieces, mica and shale. It shall not contain matters injurious to concrete. All coarse aggregate shall conform to BSS NO.882 and shall be graded as follows:

B.S. Sieve	% Passing by weight
1" (25.40 mm)	100
3/4" (19.05 mm)	90-100
3/8" ( 9.53 mm)	20-55
3/16"(4.765 mm)	0-10

The aggregate shall be stored on properly constructed paving or as directed by the Engineer.

There shall be a physical partition between the stockpiles of coarse and fine aggregate. If required aggregates shall be washed and screened to the satisfaction of the Engineer. Sieve analysis of all the aggregates to be used in the works shall



be carried out as and when required by the Engineer. All aggregate shall be subject to the approval of the Engineer.

Any aggregates not found to be of the specified/approved standard shall be rejected by the Engineer and all such rejected material shall be removed from site without delay.

Floors, sub-base or base constructed with rejected aggregates shall be dismantled and rebuilt at the expense of the Contractor.

#### 2.4 Stone Ballast

Stone ballast to be used as soling shall comprise of strong, hard, durable stone of approved size. The stone shall be obtained from approved quarry and shall be sound, free from laminations and weak cleavages and shall conform to specifications of "Stone Soling".

#### 2.5 Water

Water used for mixing concrete, curing or any other operation of the works specified herein shall be fresh, clean and free from organic or inorganic matters in solutions or in suspension. Only water of the approved quality shall be used for all constructional purposes:

#### 2.6 Porcelain tiles

Porcelain tiles shall be imported Asian Origin as specified in BOQ. The tiles shall be of sizes as specified on the drawings and shall conform to BS 1281 as per samples.

#### 2.7 Terrazzo tiles

Best quality Terrazzo tiles with white cement of approved shade/colour sizes laid over a base of 1:3 CS mortar with cement slurry filling the joints including washing, cleaning, curing and polishing complete in all respects as specified on the drawings and/or as directed by the Engineer.

#### 2.8 Cement Concrete Tile/Pavers

Cement Concrete tiles/pavers shall be of approved shade/colour, shape and size as shown on the drawings and approved by the Engineer.

#### 2.9 Division Strips

Division strips shall be of marble as approved by the Engineer. Standard division strips for floor finishes shall be not less than 5mm (3/16") in thickness and shall not be less than 1-3/4" in depth.

### 3. CEMENT CONCRETE FLOORING

The materials for C.C flooring shall be same as already specified under clause 3, "Materials".

#### 3.1 Composition of Concrete



Concrete shall be composed of Portland Cement, sand, coarse, aggregate and water, all well mixed and brought to the proper consistency. The Contractor shall mix the ingredients as indicated on the Drawings. The proportions of the various ingredients shall be determined from time to time during the progress of the work and tests shall be made of samples of the aggregates and the resulting concrete. The mix proportions and appropriate water-cement ratio will be determined on the basis of the production of concrete having required workability, density, impermeability, durability and required strength.

### 3.2 Mixing Concrete

The concrete ingredients shall be mixed in a batch mixer for not less than 1-1/2 minutes after all ingredients, except the full amount of water, are in the mixer. The Engineer reserves the right to increase the mixing time when the charging and mixing operations fail to produce a concrete batch in which the ingredients are uniformly distributed and the consistency is not uniform. The concrete shall be uniform in composition and consistency from batch to batch except when changes in composition or consistency are required. Water shall be added prior to, during and following the mixer charge. Excessive over-mixing requiring addition of water to preserve the required concrete consistency will not be permitted. The concrete ingredients shall be mixed by volumetric measurement in purpose made boxes approved by the Engineer.

### 3.3 Construction

The base course of the floor shall comprise of stone ballast of 2 inches (approx.: 50 mm) mesh size. The base course shall be thoroughly compacted by suitable power rammers to the total consolidated thickness as shown on the Drawings and as approved by the Engineer. The interstices shall be filled with smaller size stones. The base course shall be blinded with sand and the whole surface watered. Over the well compacted base course, a layer of concrete of the required grade and thickness shall be laid, in panels of the sizes as indicated on the Drawing and as approved by the Engineer.

After the C.C bed has been cured, as directed by the Engineer, it shall be roughened and well-watered before floor finishing is laid. The floor finish shall comprise of cement concrete of required grade and shall be laid in panels to the required thickness as shown on the Drawings or as directed by the Engineer. The concrete after laying will be thoroughly rammed and mortar worked up to the top and smoothed with a steel trowel. The edge of each section into which the floor is divided should be defined by wooden screeds of the approved width and of a depth equal to the depth of the floor concrete.

Freshly placed concrete floor and completed floor portions as finished shall be protected to prevent loss of water by covering with damp hessian, water proof paper, damp sand or other approved material, and shall be kept constantly damp for a period of four days or longer after concreting as directed by the Engineer. The concrete shall be allowed to dry out slowly over a period of three days after wet curing is completed.



The expansion joints shall be filled in with hot bitumen, of the approved grade, as directed by the engineer.

#### 4. INSTALLATION OF TILE FLOORING

When setting out the tiles, care shall be taken to establish the correct elevation for the floor. A gauge rod shall be used, indicating the overall measurement of a given number of tiles with specified joint width to reduce cutting.

After the floor has been machine finished, it should be covered with white, non-staining sand or rags to protect it while other work is being done. After removal, the floor shall be thoroughly scrubbed.

##### 4.1 General

The base shall be prepared by laying cement concrete of specified grade and of thickness as shown on the drawings, or specified in the Bill of Quantities.

The curing period of the setting bed shall be as directed by the Engineer. As large an area of setting bed shall be spread at one time as can be covered with tiles before the mortar has set. Surplus mortar shall be removed. The thickness of setting bed in any space shall not be less than 1/2".

Floor and wall surfaces to receive the tiles shall be thoroughly cleaned of all dirt, dust, oil and other objectionable matters. Tiles shall be laid out from the centre line of each space in an outward direction and the pattern should be made symmetrical with a minimum number of cut tiles as directed by the engineer.

Joints between the tiles shall be of uniform width. Tiles shall be cut with a suitable cutting tool and rough edges shall be rubbed smooth. Tiles shall be laid to the straight edges.

##### 4.2 Porcelain Tiles

The porcelain tiles shall be laid to the required lines, levels and grades over a setting bed of cement sand mortar comprising of one part of cement and 4 parts of sand by volume and the joints filled with neat white or grey cement including vertical and horizontal covers. The tile floor shall be kept wet for at least 72 hours and no traffic should be allowed on the tiles during curing period. Moreover, the acid-resistant tiles shall be laid as per manufacturer's instructions and as approved by the Engineer.

##### 4.3 Cement Concrete Tiles

The cement concrete tiles shall be laid to the required lines, levels and grades over a setting bed of cement sand mortar comprising of 1 part of cement and 4 parts of sand by volume.

The sides shall be buttered with cement mortar and adjacent tiles laid in the same manner in the required pattern, with a thin joint in proper level and line. The joints shall then be thoroughly cleaned with wire brush and pointed with neat cement of the same colour as the tile.



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

Cement concrete tiles shall be cured for 7 days with water and then thoroughly cleaned and dried. Notwithstanding anything written above, the manufacturer's printed instructions regarding laying shall be strictly followed.

#### 4.4 Concrete Pavers

Concrete pavers shall be laid in accordance with the instructions of the manufacturer over a cushion of sand. The pavers will be laid as per the instructions of the Engineer.

#### 4.5 Marble Tops

Pre-polished marble top  $\frac{3}{4}$ " thick or as mentioned in drawings or as instructed by the Engineer of approved quality, colour & shade to be laid in approved pattern set in 1:2 cement sand mortar base including bull-nosing & chamfering of edges and making holes for wash basin.

#### 4.6 Terrazzo Tiles

$\frac{3}{4}$ " thick terrazzo tile as mentioned in drawings/B.O. Q as instructed by the Engineer of approved quality, colour to be laid in approved pattern set in 1:3 cement sand mortar base including grinding, cleaning and polish.

### 5. MEASUREMENT AND PAYMENT

#### 5.1 General

Except otherwise specified herein or elsewhere in the Contract Documents, no measurement and payment will be made for the undermentioned specified works related to the relevant items of the Bill of Quantities.

The cost thereof shall be deemed to have been included in the quoted unit rate of the respective items of the Bill of Quantities.

- 5.1.1 Loss and wastage of material due to consolidation, erosion and settlement.
- 5.1.2 All type of joints (expansion, contraction and construction joint etc.).
  - 5.1.3 Class 'C' cement concrete screed base and 1:4 cement sand mortar under terrazzo tile on edge floor and skirting/dado etc.
  - 5.1.4 Finishing/grinding, washing & polishing works of terrazzo tiles and flooring.
  - 5.1.5 1:2 and 1:4 cement sand rough cast plaster.
  - 5.1.6 Sand cushion under concrete pavers



5.1.7 Bull-nosing, chamfering of edges of marble tops including base mortar and making holes for wash basin including all necessary fixing accessories if required.

## 5.2 Cement Concrete Floor

### 5.2.1 Measurement

Measurement of acceptably completed works of cement concrete floor steel trowelled finish will be made on the basis of net actual area in square meter laid in position as shown on the Drawings or as directed by the Engineer.

### 5.2.2 Payment

Payment will be made for acceptable measured quantity of cement concrete floor steel trowelled finish on the basis of unit rate per square meter quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

## 5.3 Ceramic/Porcelain Tile Floor

### 5.3.1 Measurement

Measurement of acceptably completed works of porcelain tile in floor will be made on the basis of net actual area in square meter foot of floor laid in position as shown on the drawing or as directed by the Engineer.

### 5.3.2 Payment

Payment will be made for acceptable measured quantity of porcelain tile floor on the basis of unit rate per square meter foot quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

## 5.4 Ceramic/Porcelain Tile Dado/Skirting

### 5.4.1 Measurement

Measurement of acceptably completed works of ceramic/Porcelain tile in dado/skirting will be made on the basis of net actual area in square meter of dado/skirting laid in position as shown on the Drawing or as directed by the Engineer.

### 5.4.2 Payment

Payment will be made for acceptable measured quantity of porcelain tile in dado/skirting on the basis of unit rate per square meter quoted in the Bills of Quantities. The unit rate shall include all cost of cement, sand, mortar and shall constitute full compensation for all the works related to the items.

## 5.5 Cement Concrete Tile Floor/Pavers

### 5.5.1 Measurement



Measurement of acceptably completed works of cement concrete tile/Pavers in floor will be made on the basis of net actual area in square meter of floor laid in position as shown on the Drawing or as directed by the Engineer.

#### 5.5.2 Payment

Payment will be made for acceptable measured quantity of cement concrete tile in floor on the basis of unit rate per square meter quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

### 5.6 Terrazzo Tile Floor

#### 5.6.1 Measurement

Measurement of acceptably completed works of terrazzo tile in floor will be made on the basis of net actual area in square meter of floor laid in position as shown on the drawing or as directed by the Engineer.

#### 5.6.2 Payment

Payment will be made for acceptable measured quantity of terrazzo tile floor on the basis of unit rate per square meter quoted in the Bills of Quantities and shall constitute full compensation for all the works related to the item.

## PAINTING

### 1. SCOPE

The work under this section of the Specifications consists of furnishing all materials, plant, labour, equipment, appliances and performing all operations in any floor and at any height in connection with surface preparation, mixing, painting concrete works, gates, frames, walls, ceilings and all such surfaces as shown on the Drawings and/or as directed by the Engineer. The scope of this section of specification is covered with detailed specifications as laid down herein.

### 2. APPLICABLE STANDARDS

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

#### 2.1 BSI (British Standards Institution)

245	Specification for mineral solvents (white spirits and related hydrocarbon solvents) for paints and other purposes.
2521	Lead-based priming paint for wood work.
2523	Lead based priming paint for iron and steel.
2569	Sprayed metal coatings.



- 4800 Paint 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 shop-painted metal work and structural steel work. Metal surfaces against which concrete is 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 12" x 12" x 1/8" 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 reputable manufacturers as approved by the Engineer.
- 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 lime-proof. All materials shall be subject to the Engineer's approval.
- 4.3 All synthetic enamel paints and primers for structural steel works, metal work and Matt enamel for wood works will be the best available of its type and shall be approved by the Engineer prior to its procurement.
- 4.4 Approved quality Weather Shield/Weather Coat paint shall be used for painting the exteriors of the structures or other surfaces where specified on the drawings as directed by the Engineer.
- 4.5 The synthetic enamel matt finish paint or similar as approved by the Engineer shall be used for interior wall & ceiling surfaces.
- 4.6 All material for Bitumen painting shall consist of Bitumen grade 10/20. It shall be used for foundations or wherever recommended by the Engineer. The rate of application in foundations shall not be less than 5.0 lb/10 Sft. each coat.
- 4.7 All paints to be used shall be got approved prior to place order & usage.



All material shall be delivered to site in their original unbroken containers or packages & bear the manufacturer's name, label, brand & formula & will be mixed and applied in accordance with his directions.

## 5. DELIVERY STORAGE AND CONTAINER SIZES

Paints shall be delivered to the site in sealed containers, which plainly show the type of paint, colour (formula or specifications number) batch number, quantity, date of manufacture, name of manufacturer and instructions for use. Pigmented paints shall be supplied in containers not larger than 20 liters. All materials shall be stored under cover in a clean storage space, which should be accessible at all times to the Engineer. If storage is allowed inside the building, floors shall be kept clean and free from paint spillage.

## 6. SURFACE PREPARATION

6.1 All oil, grease, dirt, dust, loose mill scale and any other foreign substance shall be removed from the surface to be painted, polished and white washed by the use of a solvent and clean wiping material. Following the solvent cleaning, the surfaces shall be cleaned by scrapping, chipping, blasting, wire brushing or other effective means as approved by the Engineer.

6.2 In the event the surfaces become otherwise contaminated in the interval between cleaning and painting, recleaning will be done by the Contractor at no additional cost.

6.3 Surfaces of stainless steel, aluminum, bronze, and machined surfaces adjacent to metal work being cleaned or painted shall be protected by effective masking or other suitable means, during the cleaning and painting operations.

6.4 All the surfaces to be painted with approved quality paint shall be free from dust, dirt, fungus, lichen, algae etc. Oil paint, varnish and lime wash should always be removed by scraping and washing.

6.5 All surfaces to be bitumen painted shall be thoroughly cleaned of any accretion, dust, dirt etc. by scraping, wire-brushing or as directed by the Engineer. The surface shall be primed with a coat of asphalt oil used at the rate of not less than 0.50 pound per square meter.

No work in this section shall be allowed until all surfaces or conditions have been inspected and approved by the Engineer.

## 7. APPLICATION

7.1 All paint and coating materials shall be in a thoroughly mixed condition at the time of application. All work shall be done in a workman like manner, leaving the finished surface free from drips, ridges, waves, laps, and brush marks. All paints shall be applied under dry and dust free conditions. Unless approved by the Engineer paint shall not be applied when the temperature of the metal or of the surrounding air is below 7 degrees centigrade. Surfaces shall be free from moisture at the time of painting.

All primary paint shall be applied by brushing. The first coat of paint shall be applied immediately after cleaning. When paint is applied by spraying, suitable measures shall be taken to prevent segregation of the paint in the container during painting operation.



Effective means shall be adopted for removing all free oil and moisture from the air supply lines of the spraying equipment. Each coat of paint shall be allowed to dry or harden thoroughly before the succeeding coat is applied. Surfaces to be painted that will be inaccessible after installation shall be completely painted prior to installation.

Paint shall be applied in accordance with the manufacturer's instructions or as directed by the Engineer.

Only as much material should be mixed as can be used up in one hour. Over-thinning will not be permitted. After the first coat the surfaces will be soaked evenly four or five times and the second coat shall be applied after leaving for at least overnight.

- 7.2 Where shown on Drawings all exterior finishes shall be painted with Weather Shield/weather coat paint in approved colours as per manufacturer's specifications. The number of coats shall be as shown on the drawings or as directed by the Engineer.
- 7.3 All wooden doors shall be painted with approved Matt enamel paint as per manufacturer's recommendation and instructions or after approval of the Engineer.
- 7.4 Plastic emulsion paint, vinyl emulsion paint or matt enamel paint of the approved make and shade shall be applied to surfaces as shown on Drawings as per manufacturer's instructions. The number of coats shall be as indicated on the Drawings or as directed by the Engineer.
- 7.5 Two coats of hot bitumen paint shall be applied to exposed concrete surfaces in contact with earth. The first coat shall be allowed to dry for about six hours before applying the second coat. During the operation of painting great care should be taken to avoid air bubbles. The manufacturer's instructions and Engineer's directions shall be complied with.

## 8. JOB CONDITIONS

- 8.1 Observe manufacturer's recommended minimum and maximum temperature but do not apply paint or finish to any surface unless ambient temperature is 10 degree C or above and less than 43-degree C. No painting shall be done above 90% relative humidity.
- 8.2 Place drop cloths to adequately protect all finished work.
- 8.3 Remove and replace all items of finish hardware, device plates, accessories, lighting fixtures or other removable items.
- 8.4 In no case shall any finish hardware or other finished item that is already fitted into place be painted, unless otherwise specified.

## 9. QUALITY ASSURANCE

All paint for any one surface shall be top quality, of one manufacturer and approved by the Engineer. Deep tone accent colours shall be used and the unavailability of final coat colours may be the basis for rejecting materials for any one surface.

## 10. SCHEDULE OF MEASUREMENT OF PAINT AREA:



Irrespective of prime coats and number of paint coats applied to exposed painting surface area of column, walls, projections, ceilings, false ceilings and other surfaces (Except gates, doors windows and ventilators) shall be measured as per actual paint surface area for single time only and paid in accordance with quoted rate of Bill of Quantities.

## 11. MEASUREMENT AND PAYMENT

### 11.1 General

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

The rates quoted by the Contractor in the Bill of Quantities shall include work to be executed under this specification in any floor and at any height except where otherwise specifically stated in the relevant item of Bill of Quantities and the Contractor shall not be entitled to any claim or claim any compensation on this account.

11.1.1 Preparatory works, including preparatory materials, scraping, scratching, sand blasting, cleaning, prime coating, priming, protection of finished works etc.

11.1.2 Polishing works, including preparatory materials, scraping, cleaning, sanding etc.

11.1.3 Painting work on steel & wooden surfaces.

11.1.4 Before application of paint on existing surface the old paint surface shall be removed existing paint, filling of cracks, surface preparation and application of primer coat, if any.

11.1.5 Scaffolding at any height and level.

### 11.2 Painting

#### 11.2.1 Measurement

Measurement of acceptably completed respective type of painting works will be made on the basis of net actual areas in square meter of the surface painted as shown on the Drawings or as directed by the Engineer.

#### 11.2.2 Payment

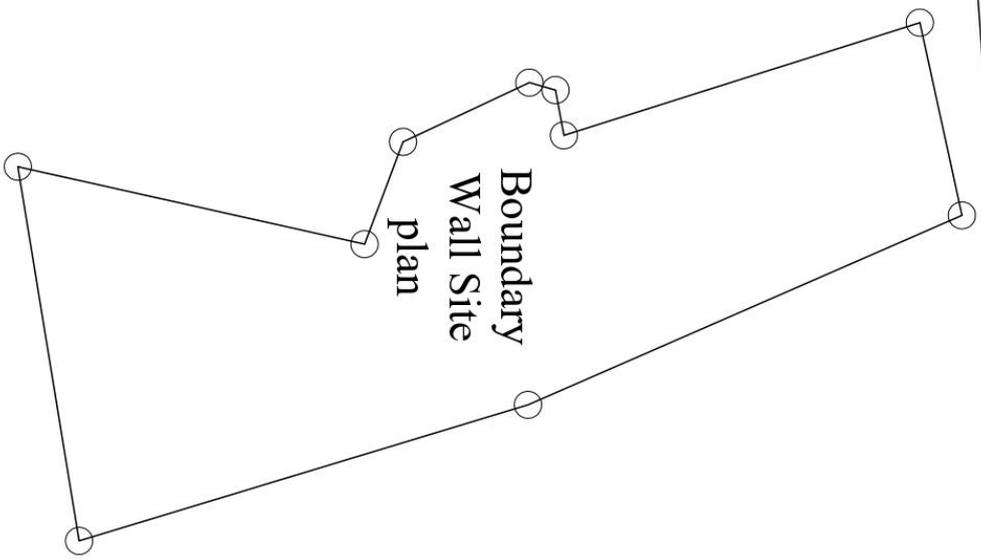
Payment will be made for acceptable measured quantity of respective type of painting on the basis of unit rate per square meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.



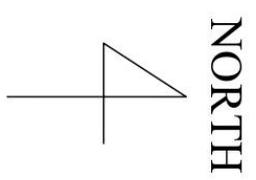
## ***DRAWINGS***

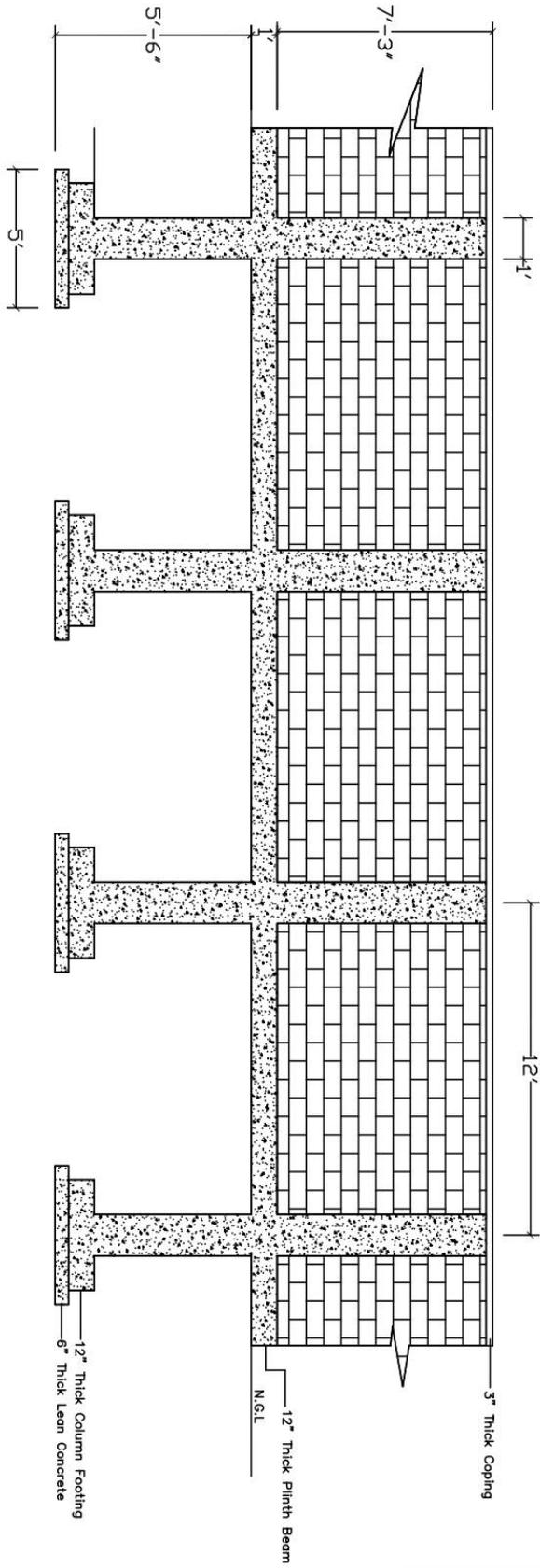
**PROPOSED SITE PLAN FOR INFRASTRUCTURE  
WORK OF OFF- DOCK TERMINAL AT GWADAR**

Makran Coastal High Way



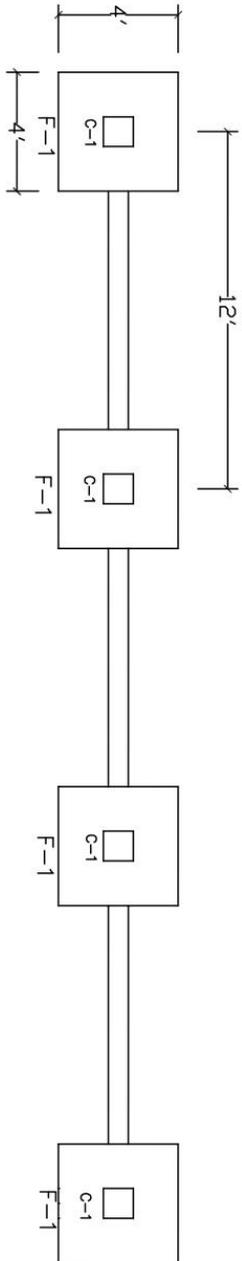
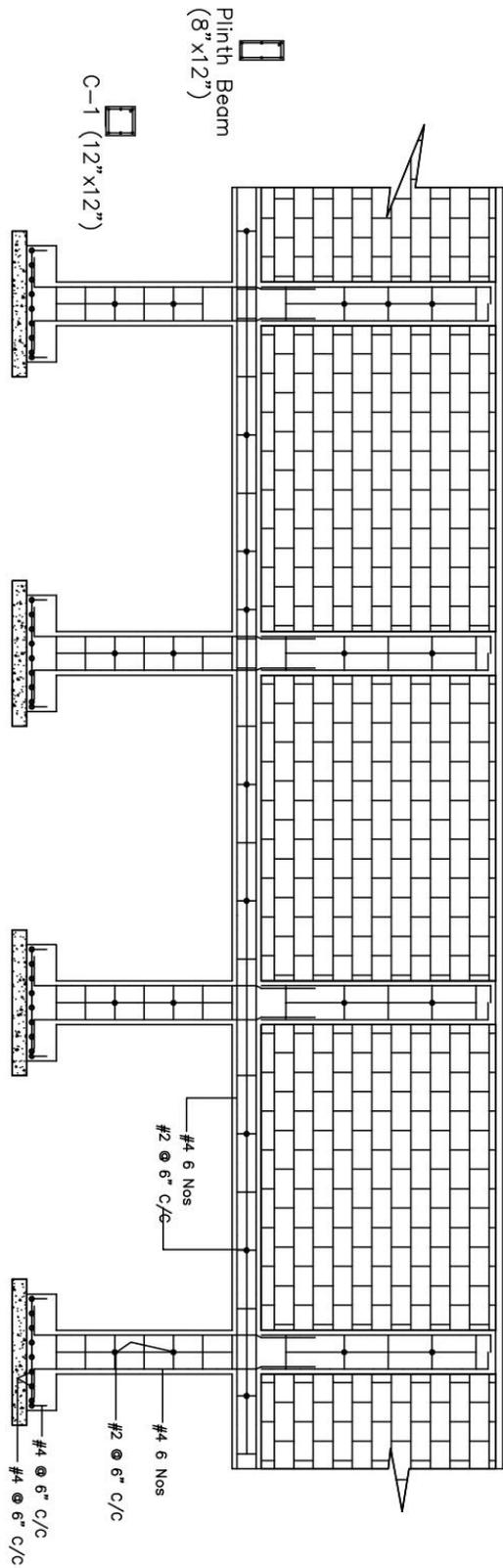
**Boundary  
Wall Site  
plan**





Client:	Executed by:	DRAWING TITLE:	DRAWN BY:
GWADAR PORT AUTHORITY	Architectural Drawing	TENDER DRAWING FOR THE BOUNDARY WALL OF OFF-DOCK TERMINAL GWADAR	ABDUL RAZZAQ
			CHECKED BY: ABDUL WAHID (PD GPA)
			APPROVED BY: ABDUL WAHID (PD GPA)

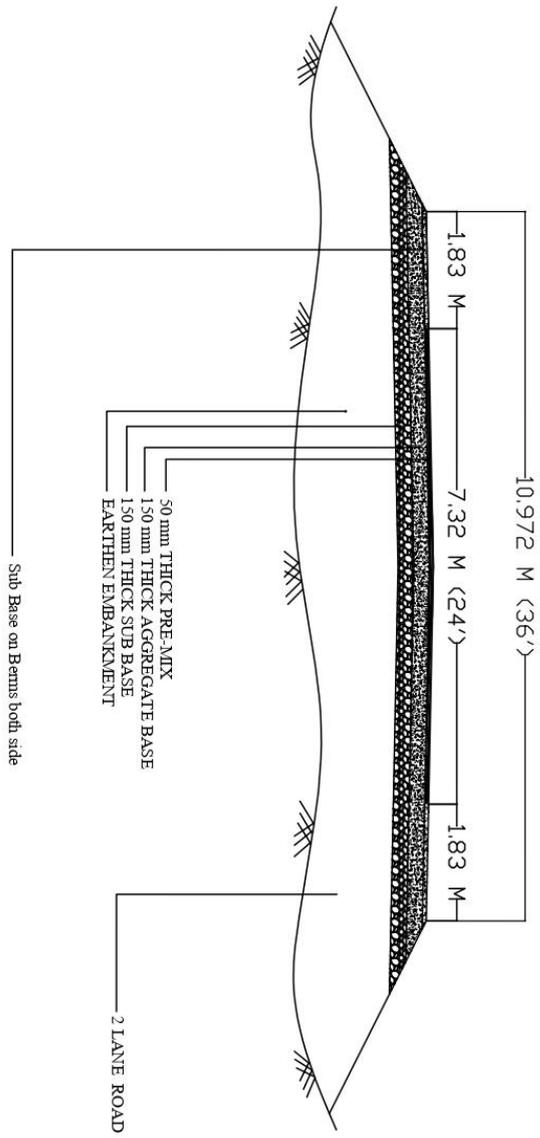




Client: GWADAR PORT AUTHORITY	Executed by:	DRAWING TITLE: Structural Drawing	DRAWING TITLE: TENDER DRAWING FOR THE BOUNDARY WALL OF OFF-DOCK TERMINAL GWADAR	DRAWN BY: ABDUL RAZZAQ
	CHECKED BY: ABDUL WAHID (PD GPA)			
				APPROVED BY: ABDUL WAHID (PD GPA)

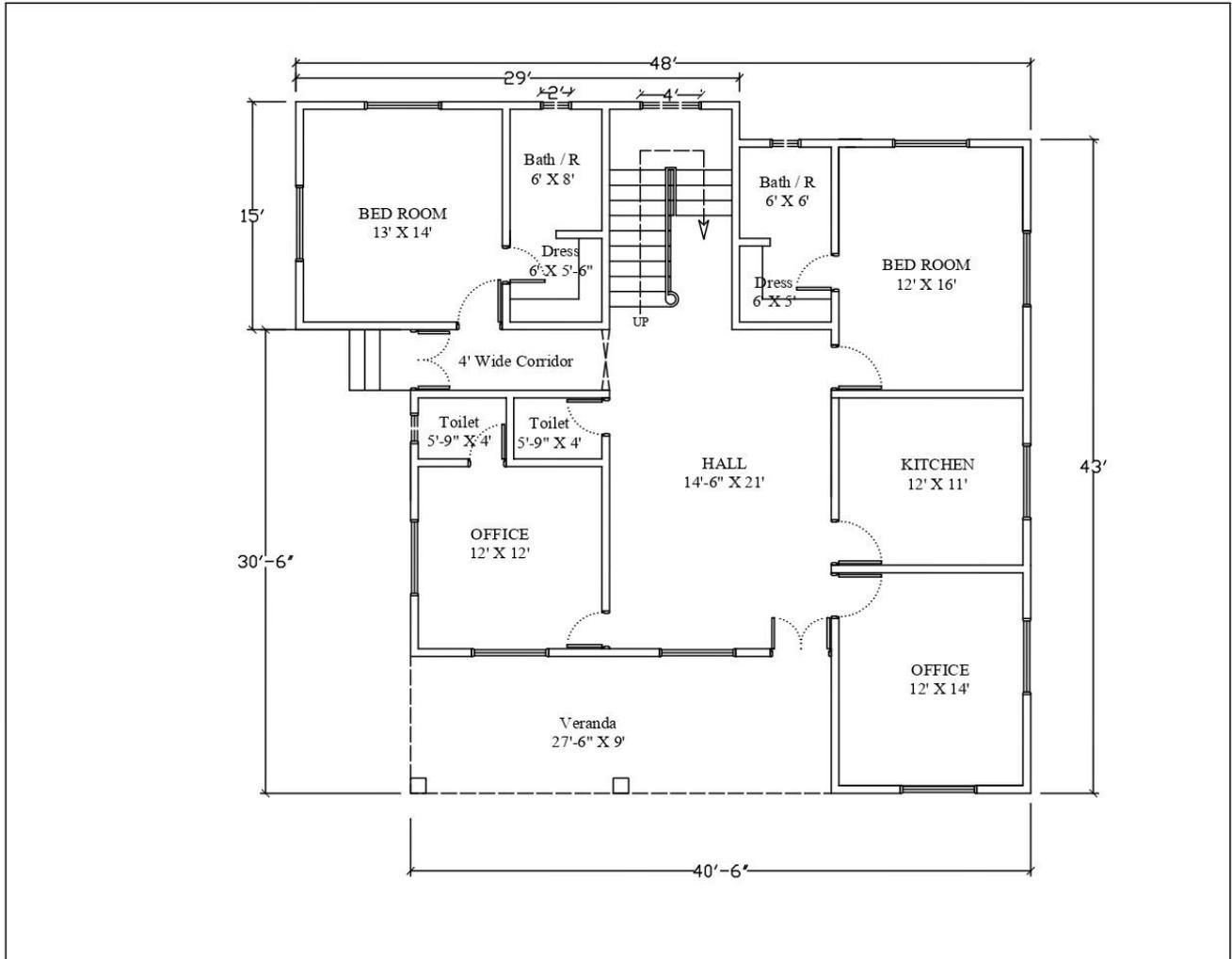


# INFRASTRUCTURE WORK OF OFF-DOCK TERMINAL AT GWADAR



TYPICAL CROSS-SECTION OF INTERNAL ROAD





DATED:- 09-10-2025	CLIENT:- Gwadar Port Authority	PROPOSED PLAN:- ARCHITECTURAL PLAN FOR GROUND FLOOR	DRAWN BY: ABDUL RAZZAQUE	TOTAL AREA: 100 Acres sq.ft
SCALE N.T.C	TENDER DRAWING FOR THE OFFICE CUM REST HOUSE FOR OFF DOCK TERMINAL GWADAR		CHECKED & APPROVED BY: PROJECT DIRECTOR OFF DOCK	COVERED AREA: 1004.00 sq.ft



## **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**

## 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 above in 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**

**Letter of Bid – Technical Proposal**

**Letter of Bid - Financial Proposal**

**Bidder Information Form**

**Personnel**

**Form of Bid Security**

# 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:** 7<sup>th</sup> November 2025

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

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

To: [Project Director Infrastructure work of Off-Dock Terminal GPA Head Office Gwadar]

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



(1) **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.:** Infrastructure work of Off-Dock Terminal at Gwadar

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

**To: [Project Director Infrastructure work of Off-Dock Terminal GPA Head Office Gwadar]**

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 -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: N/A
3. Bidder's actual or intended country of registration: PEC registration NO:
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.



# Personnel

## 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

<b>1.</b>	<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>
<b>2.</b>	<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>
<b>3.</b>	<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>
<b>4.</b>	<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>
<b>5.</b>	<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>
<b>6.</b>	<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>



## 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: [language and levels of speaking, reading and writing skills]</b>	
<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.

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



**Declaration**

I, the undersigned [ 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 of Bid Security

### (Bank Guarantee)

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

*[Guarantor letterhead or SWIFT identifier code]*

**Beneficiary:** *[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.*

## Formula for Price Adjustment

**[Note to Procuring agency/Employer: It is recommended that in the case of very large and/or complex works contracts, it may be necessary to specify several families of price adjustment formulae corresponding to the different works involved. When finalizing the contract document, ensure that the finalized Schedule of Cost Indexation is attached to the Contract Agreement.]**

- a) Price Adjustment/ escalation shall not be applicable on Civil, Mechanical and Electrical projects /contracts having contract life less than 365 days from the date of the signing of the contract.
- b) Procuring Agency/Employer is advised not to change any provisions hereof unless otherwise stated by the Authority.
- c) No method, other than given in this formula will be applicable to compute the price adjustment.
- d) This document will be applicable only for Price Adjustment in local currency (Pak. Rs.). Price Adjustment in foreign currency is not allowed.
- e) Price Adjustment formula and corresponding references to be inferred for price adjustment shall be agreed and firmed up before signing of the contract. Procuring agency and contractor shall firm up the weightages and co-efficient for respective items before signing of the contract and there shall be no change permissible in the weightages after signing of the contract.
- f) For imported plant/ equipment and materials quoted in local currency (Pak. Rs.), foreign currency, exchange rates shall be fixed at the respective interbank currency exchange rates, 28 days prior to the tender opening date. The change in foreign currency exchange rate will be applicable to the foreign currency component stated in the Letter of Credit established by the Contractor or his Vendor.
- g) This procedure is to assist the Procuring agency/Employer and bidder for the preparation of provisions for price adjustment in their bidding / contract documents. All the coefficients of the price adjustment formula shall be specified in the bidding document at the time of advertisement.

*[The formulae for price adjustment shall be of the following general type:]*

$$P_n = A + b \frac{L_n}{L_o} + c \frac{M_n}{M_o} + d \frac{E_n}{E_o} + \dots$$

where,

“P<sub>n</sub>” is the Price Adjustment factor for the work carried out in the period “n”



“A” is a constant or the Non-Adjustable Portion of the Price Adjustment Factor to be specified in Appendix-C to Bid, representing the Non-Adjustable Portion of the Contract Price.

“b, c, d.....” are Coefficients or weightages of the order of 0.xx (i.e., fractions rounded off to two decimals) for each specified element of adjustment in the Contract. The sum of A, b, c, d, etc., shall be one.

“Ln”, “En”, “Mn”, ... are the current cost indices or reference prices for period “n”, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the date 28 days prior to the last day of the period (to which the particular Payment Certificate relates); and

“Lo”, “Eo”, “Mo”, ... are the base cost indices or reference prices, expressed in the relevant currency of payment, each of which is applicable to the relevant tabulated cost element on the Base Date.

1. Construction schedule should be provided by the contractor as required in the Contract. Price Adjustment shall be applicable as payable in full for the original scheduled completion period.
2. In the event the completion of contract exceeds the original scheduled period:
  - 2.1 In case of default on the part of the contractor causing delay in original scheduled completion, the rate of Price Adjustment will be frozen at the original scheduled date of completion; however Price Adjustment will be applicable till actual completion. While computing Price Adjustment beyond the scheduled completion period, in the event the rate is reduced, then that reduced rate will be applied.
3. The Price Adjustment will be payable in full for the extended period if the contractor has been granted an extension of time for no fault on the part of the contractor, duly approved by the Employer.
4. Unless specifically stated otherwise in the contract, the basis for compensation will be only those elements, which are specifically listed as specified items in the tender documents. This list will specify the elements for Civil, Electrical, Mechanical, Sanitary, HVAC, etc., separately.
5. Formula for Price Adjustment provided herein will be applicable for all the contracts such as Civil, Electrical, Mechanical, etc.
6. There shall be no Price Adjustment for the elements which the Employer has either supplied free of cost or at fixed prices as well as for those elements for which an umbrella *ex gratia* or escalation cover is provided by the Government through an Executive Order or Statutory Regulatory Order (SRO).

### Weightages of Specified Items

Each of the cost elements, having cost impact of five (05) percent or higher can be selected for adjustment.



In determining the weightages, the following procedure shall be adopted:

- a) Base Date Price alone of an element based on market rate shall be considered excluding cost of construction/ installation, overheads and profit.
- b) Engineer's Estimate shall be prepared for complete project.
- c) Appropriate Rate Analysis of the Engineer's Estimate shall be made to determine costs of the basic elements.
- d) For such cost elements having various types of a particular element, individual cost of such family of the element used in the project to be determined and added to work out the element cost. (Grade-40 and Grade-60 steel shall be treated under same category).
- e) Each cost element determined as above, shall be divided by the total amount of Engineer's Estimate to determine various weightages.

### **Weightage of Fixed Portion**

Weightage of fixed portion (Non-adjustable portion of the estimated cost of the contract), shall be determined as under:

- a) First the weightages of all the cost elements having value of five (5) percent or more to be added up to see whether the total is 75 percent or less. In that case the total is to be subtracted from one (01) to determine the weightage of the fixed portion,
- b) In case total weightage of the cost elements including HSD and labour exceeds 75 percent, the element(s) having lowest weightage(s) other than HSD and labour, shall be excluded in considering the adjustable costs elements.
- c) Fixed portion shall be 25 percent and in case the fixed portion exceeds 25 percent it shall be supported by calculations attached with the bidding documents.
- d) Sum of fixed portion and weightages b, c, d, ....etc., of the adjustable portion shall always be one (01).

### **Base Date Price**

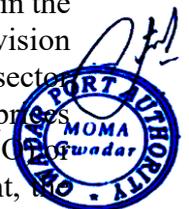
The base date price (or base date index) of any element shall be the price of the element for the month on the day falling 28 days prior to the last day for submission of bids.

### **Current Date Price**

The current date price (or current date index) of any element shall be the price of the element for the month falling on the day 28 days prior to the last day of the period to which the particular Payment Certificate relates.

### **Sources of Prices**

The prices of elements subject to Price Adjustment shall be to the extent possible as given in the Statistical Bulletins published by Federal Bureau of Statistics (FBS), Statistical Division Government of Pakistan. Statutory notifications and official price from public sector organizations, where available, may be used at the option of the Employer. The source for prices of High Speed Diesel (HSD) shall be either Statistical Bulletins or Pakistan State Oil (PSO) Oil and Gas Regulatory Authority (OGRA). However, for a particular adjustable element,



same source should be used throughout the currency of contract as also stipulated in the tender documents before issuing the tender documents.

The Base Date Prices and Current Date Prices of the specified elements shall be obtained from the sources specified in the contract.

### **Method for payment of bills**

The billed amount of the Works for each calendar month will be obtained from the checked bills submitted by the Contractor. In case the billed amount is for more than one month, the amount of the bill shall be segregated for actual workdone in each month.

### **Coefficient or Weightages**

- a) The coefficient for each specified element shall be calculated and given in the bidding/tender documents. The coefficient for each specified adjustable element shall be determined by the user proportionate to its ratio in the total amount of the Engineer's Estimate, in accordance with the prescribed procedure. The sum of these coefficients shall form the adjustable portion of the Contract, which shall not exceed 0.75.
- b) Coefficients for each adjustable item shall be agreed by both parties and shall be fixed and locked at the time of the signing of the contract and shall remain constant during the currency of the contract.

### **Price Adjustment for Lump Sum Contract**

- a) Formula of Price Adjustment shall be used in determining Price Adjustment for contracts having detailed breakdown of cost. However, when a contract is assigned on lump sum basis without detailed breakdown of quantities and cost, Price Adjustment for the Specified Elements in the contract will be computed as follows:

$$\text{Increase/ Decrease in Cost (Price Adjustment Factor)} = \frac{\text{Current Date Price} - \text{Base Date Price}}{\text{Date Price}}$$

- b) If the resulting Price Adjustment Factor is positive (+ve), the price should be added to the contractor's payable amount. If the result is negative (-ve), the price should be subtracted from the payable amount.
- c) The executed quantities of the elements subject to Price Adjustment can be obtained from the actual measurement or from certified invoice of the contractor or any other mode agreed between the parties which shall be stipulated in the contract.



## 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.

### **International Federation of Consulting Engineers (FIDIC)**

FIDIC Bookshop – Box- 311 – CH – 1215 Geneva 15 Switzerland

Fax: +41 22 799 49 054

Telephone: +41 22 799 49 01

E-mail: [fidic@fidic.org](mailto:fidic@fidic.org)

[www.fidic.org](http://www.fidic.org)

FIDIC code: ISBN13: 978-2-88432-084-9



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

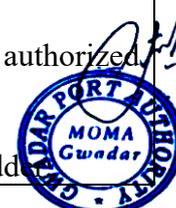
## Special Conditions of the Contract

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>Abdul Wahid</p> <p>Project Director Infrastructure work of Off-Dock Terminal at Gwadar</p> <p>Contractors Authorized representatives name and address:</p>
2.	1.4	<p><b>Governing Law;</b></p> <p>The Applicable Law shall be: Laws of the Government of Pakistan</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> <ol style="list-style-type: none"> <li>1. Bidding documents dully filled/signed by authorized person</li> <li>2. Bidder Profile</li> <li>3. Affidavit regarding not blacklisting in any organization</li> <li>4. Affidavit regarding sole proprietorship of firm</li> <li>5. Integrity Pact on stamp paper dully signed/stamp by authorized person</li> <li>6. Letter of Acceptance;</li> <li>7. Form of Bid and the Price Schedule submitted by the Bidder</li> </ol>



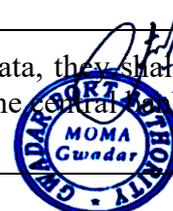
		8. Works Requirements & Technical Specifications & Drawings 9.General Conditions of the Contract 10.Special Conditions of Contract, 11.Completed schedule including Bill of Quantities 12. FIDIC Condition of contract for works of Civil Engg Construction
<b>The Employer/ Procuring agency/Employer (GCC Clause 2)</b>		
5.	2.1	Time for access to the Site: 07 days after Commencement Date (issuance of letter of commencement by Client)
<b>The Engineer (GCC Clause 3)</b>		
6.	3.2	Engineer's Duties and Authority: Variations resulting in an increase of the Accepted Contract Amount in excess of <u>15%</u> shall require approval of the Procuring agency/Employer.
<b>The Contractor (GCC Clause 4)</b>		
7.	4.2	Performance guarantee/ security will be in the form of a Bank Guarantee or Insurance Guarantee in the amount of 10% of contract amount/price.
8.	4.7.2(a)	<b>Clause 4.7 Setting out</b> Period for notification of errors in the items of reference "[120 days]"
9.	4.22	<b>Contractor's Operations on site</b> The project site is located near New Gwadar Internal Airport area and 35KM away from Gwadar city. Contractor has to manage and shift the construction equipment/material at site after receiving the letter of commencement. Contractor to establish a camp office with necessary facilities for execution of the project activities.
<b>Sub-Contracting (GCC Clause 5)</b>		
10.	5.1(a)	Maximum allowable accumulated value of work subcontracted (N/A)
11.	5.1 (b)	Works for which sub-contracting is not permitted. N/A
<b>Staff and Labour (GCC Clause 6)</b>		
12.	6.5	Normal working hours (9AM to 5PM)
<b>Plant, Material and Workmanship (GCC Clause 7)</b>		
13.	7.2	As per construction requirement
<b>Commencement, Delays and Suspension (GCC Clause 8)</b>		
14.	8.3	Number of additional paper copies of program [one]



15.	8.8	Delay damages shall be payable for each day of delay shall be 0.1% 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 per actual work done as per PEC/FIDIC rules & regulation
17.	12.3	Percentage profit 5 to 10%
<b>Variations and Adjustments (GCC Clause 13)</b>		
18.	13.4 (b)(ii)	Percentage rate to be applied to Provisional Sums for overhead charges and profit is 10 % <i>without applicable taxes</i>
19.	13.7	Adjustments for Changes in Cost: The Contract Price “shall be fixed” during Contract Execution.
<b>Contract Price and Payment (GCC Clause 14)</b>		
20.	14.2	Total advance payment shall be 10% Percentage of the Accepted Contract Amount payable in the currency and proportion of the contract. <i>[PEC installments rule applicable]</i>
21.	14.2.3	Repayment of Advance payment: <i>PEC rule applicable</i>
22.	14.3(iii)	Percentage of retention: 5% Limit of Retention Money 5%
23.	14.5(b)(i)	Plant and Materials: If Sub-Clause 14.5 applies: Plant and Materials for payment when shipped: N/A
24.	14.5(c)(i)	Plant and Materials: Plant and Materials for payment when delivered to the site. Payment will be made after execution of construction material.



25.	14.6.2	Withholding (amounts in) an IPC: 5% Retention Money will be withheld
26.	14.7(a)	Period of payment of Advance Payment to the Contractor: As per PEC rule
27.	14.7b(i)	Period for the Procuring agency/Employer to make interim payments to the Contractor under Sub-Clause 14.6 (interim Payment) 30 days
28.	14.7b(ii)	Period for the Procuring agency/Employer to make interim payments to the Contractor under Sub-Clause 14.13 (Final Payment): 60 days
29.	14.7(c)	Period for the Procuring agency/Employer to make final payment to the Contractor 56 days
30.	14.8	financing charges for delayed payment (percentage points above the average bank short-term lending rate as referred to under subparagraph (a)): As per PEC rule
31.	14.11.1(b)	Number of additional paper copies of draft Final Statement: 02
32.	14.15	<b>Currencies of Payment</b> The Contract Price shall be paid in the currency or currencies named in the Contract Data. If more than one currency is so named, payments shall be made as follows:  (a) if the Accepted Contract Amount was expressed in Local Currency only.
33.	14.15 (a)(i)	The proportions or amounts of the Local and Foreign Currencies, and the fixed rates of exchange to be used for calculating the payments, shall be as stated in the Contract Data, except as otherwise agreed by both parties. N/A
34.	14.15 (c)	Payment of Delay Damages shall be made in the currencies and proportions specified in the Contract Data.
35.	14.15 (f)	If no rates of exchange are stated in the Contract Data, they shall be those prevailing on the Base Date and published by the central bank of the Country.



36.	17.2 (d)	<p><b>Liability for Care of the Works</b></p> <p>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.</p>
<b>Insurance (GCC Clause 19)</b>		
37.	19.1	N/A
38.	19.2.1(b)	N/A
39.	19.2.1(iv)	N/A
40.	19.2.2	N/A
41.	19.2.3(a)	N/A
42.	19.2.3(b)	N/A
43.	19.2.3	N/A
44.	19.2.4	N/A
45.	19.2.6	<p><b>Insurance</b></p> <p>The contractor shall provide insurances required by the Laws of the countries where (any part of) the Works are being carried out, at the Contractor's own cost. Other insurances required by local practice (if any) shall be detailed in the Contract Data and the Contractor shall provide such insurances in compliance with the details given, at the Contractor's own cost.</p>
<b>Dispute Avoidance/ Adjudication Board (GCC Clause 21)</b>		
46.	21.1	Time for appointment of DAAB: N/A
47.	21.1	The DAAB shall comprise: N/A
48.	21.1	N/A
49.	21.2	N/A



## **SECTION VIII: CONTRACT FORMS**

# Notification of Award

(On Procuring agency/Employer's letterhead)

Letter of Acceptance

[Date]. . . . .

To: . . . . .[Name and address of the contractor]

Subject: . . . . .[Notification of Award Contract No.]

This is to notify you that your Bid dated . . . . .[date]. . . . . for execution of the . . . . .[name of the contract and identification number, as given in the Bid Data Sheet] . . . . . for the Accepted Contract Amount of the equivalent of . . . . . [amount in words and figures and name of currency]. . . . ., as corrected and modified in accordance with the Instructions to Bidders, is hereby accepted by our Agency.

You are requested to furnish the Performance Security within 28 days in accordance with the Conditions of Contract, using for that purpose the Performance Security Form included in Section 9 (Contract Forms) of the Bidding Document.



Authorized Signature: .....

Name and Title of Signatory: .....

Name of Agency: .....

Attachment: Contract Agreement

## 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 or Insurance guarantee bond from AA ranking company 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]*

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*[address]*

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*[date]*

# Advance Payment Security

## Demand Guarantee

**Beneficiary:** \_\_\_\_\_

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

**ADVANCE PAYMENT GUARANTEE No.:** \_\_\_\_\_

**Guarantor:** \_\_\_\_\_

We have been informed that [Inset name of the Contractor] (hereinafter called "the Contractor") has entered into Contract No. \_\_\_\_\_ dated \_\_\_\_\_ with the [insert name of the Procuring agency/Employer] (hereinafter called "the Procuring agency/Employer") for the execution of \_\_\_\_\_ (hereinafter called "the Contract").

Furthermore, we understand that, according to the conditions of the Contract, an advance payment in the sum \_\_\_\_\_ (\_\_\_\_\_) is to be made against an advance payment guarantee.

At the request of the Contractor, we as Guarantor, hereby irrevocably undertake to pay the Procuring agency/Employer any sum or sums not exceeding in total an amount of \_\_\_\_\_ upon receipt by us of the Procuring agency/Employer's complying demand supported by the Procuring agency/Employer's statement, whether in the demand itself or in a separate signed document accompanying or identifying the demand, stating either that the Applicant:

(a) has used the advance payment for purposes other than the costs of mobilization in respect of the Works; or

(b) has failed to repay the advance payment in accordance with the Contract conditions, specifying the amount which the Contractor has failed to repay.

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 advance payment referred to above has been credited to the Contractor on its account number \_\_\_\_\_ at \_\_\_\_\_..

The maximum amount of this guarantee shall be progressively reduced by the amount of the advance payment repaid by the Contractor as specified in copies of interim statements or payment certificates which shall be presented to us.

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

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



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

## Retention Money Security Demand Guarantee

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