Standard Bidding Document

ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES
(Works)

National

Single Stage-Two Envelope

September 12, 2026

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REQUEST FOR BIDS

PROCUREMENT OF CIVIL WORKS

1. The **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority)** has reserved Funds for the procurement planned for FY **2026-27**. The **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority)** intends to apply part of the proceeds of this Fund to cover eligible payments under the contract for the "**ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES**" with the reference of "**P114094**".

2. The **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority)** invites electronic Bids from eligible Bidders for procurement of Works **(ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES)** described in the bidding documents on **EPADS v2.0**.

3. **Single Stage-Two Envelope** will be used by adopting **Least Cost Based Selection (LCBS)** Technique for the subject procurement, in line with the Public Procurement Rules, 2004 and any Regulations, Regulatory Guides, Procurement Guidelines or Instructions issued by the Authority from time to time.

4. All Bids must be accompanied by a Bid Security amounting described in Bid Security Section in Bidding Document in the form of . Or all bids must be accompanied by bid securing declaration in the format specified in the Bidding documents

5. E-Bidding documents, containing detailed terms & conditions, specifications and requirements etc. are available on **e-Pak Acquisition and Disposal System (EPADS)** at **https://epads.gov.pk/opportunities/federal/procurements/114094** for all the interested bidders registered on **EPADS v2.0**. Bidders are required to get themselves registered on **EPADS v2.0** to participate in Bidding process.

6. The e-bids, prepared in accordance with the instructions in the e-Bidding documents, must be submitted through **EPADS v2.0** on or before **Thursday, October 1, 2026 12:00 PM**. E-bids will be opened by using **EPADS v2.0** on the same day at **Thursday, October 1, 2026 12:30 PM**. Manual submission

of Bids shall not be entertained. Those vendor who have not yet registered on the new version of **EPADS v2.0**, may register themselves on **https://pa.epads.gov.pk/**. A tutorial to explain the registeration process is available at **https://www.youtube.com/watch?v=MNW6T38v7tc.**

In terms of Rules 48 of Public Procurement Rules, 2004 Grievance Redressal Committee (GRC) is notified for the subject procurement and notification copy is available on the procuring agency's website and on Authority's website at (**www.ppra.org.pk**).

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Instructions to Bidders

A. INTRODUCTION

1. **Scope of Bid**

1.1. The Procuring agency/Employer (PA), as indicated in the **Bid Data Sheet** (BDS) invites Bids for the execution of Works as specified in the BDS and **Section V- Works Requirements**. The name, identification, and number of lots (contracts) of this National/ International Competitive Bidding process are specified in the BDS.

2. **Source of Funds**

2.1. Source of funds as referred in Clause 2 of Bid Data Sheet.

3. **Eligible Bidders**

3.1. 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. Verifiable copy of the agreement that forms a joint venture, consortium or association shall be required to be submitted as part of the Bid.

Any bid submitted by the joint venture, consortium or association shall indicate the part of proposed contract to be performed by each party and each party shall be evaluated (or post qualified if required) with respect to its contribution only, and the responsibilities of each party shall not be substantially altered without prior written approval of the Procuring Agency and in line with any instructions issued by the Authority.

(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).

3.2. 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. Procuring agencies shall specify the registration/licensing requirements for the foreign bidder keeping in view the requirement of that business.

3.3. 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:

3.3.1. 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

3.3.2. have controlling shareholders in common; or

3.3.3. receive or have received any direct or indirect subsidy from any of them; or

3.3.4. have the same legal representative for purposes of this Bid; or

3.3.5. 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

3.3.6. Submit more than one bid in this bidding process.

3.4. A Bidder may be ineligible if –

3.4.1. he is declared bankrupt or, in the case of company or firm, insolvent;

3.4.2. payments in favor of the bidder is suspended in accordance with the judgment of a court of law other than a judgment declaring bankruptcy and resulting (in accordance with the national laws) in the total or partial loss of the right to administer and dispose of its property;

3.4.3. the bidder is convicted, by a final judgment of a Court of Law or relevant Professional Statuary Body, of any offence involving professional conduct;

3.4.4. 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.

3.5. As and when required, 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.

3.6. 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.

4. **Eligible Material and Equipment**

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”.

B. BIDDING DOCUMENTS

5. **Contents of Bidding Documents**

5.1. 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 ITB 7.1 include:

i. Section I -Invitation for Bids

ii. Section II Instructions to Bidders (ITBs)

iii. Section III Bid Data Sheet (BDS)

iv. Section IV Eligible Countries

v. Section V Evaluation and Qualification Criteria

vi. Section VI Works Requirements Technical Specifications & Schedule of Requirements

vii. Section VII Standard Bidding Forms

viii. Section VIII General Conditions of Contract (GCC)

ix. Section IX Particular Conditions of Contract (PCC)

x. Section X Contract Forms

5.2. 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.

6. **Clarification of Bidding Document, Pre-bid Meeting**

6.1. A prospective bidder requiring any clarification of the bidding document may notify the Procuring agency/Employer through **EPADS v2.0**.

6.2. The Procuring agency/Employer shall respond to the request for clarification in accordance with the Public Procurement Rules 2004, Rule No.31 i.e. **Clarification of bids**.

6.3. Should the Procuring Agency deem it necessary to amend the BIDDING document as a result of a clarification, it shall do so following the procedure under **ITB 7**.

6.4. If indicated in the **BDS**, the bidder's designated representative is invited at the bidder's cost to attend a pre-bid meeting at the place, date and time mentioned in the BDS. During this pre-bid meeting, prospective bidders may request clarification of the schedule of requirement, the evaluation criteria or any other aspects of the bidding documents.

6.5. 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 uploaded on **EPADS v2.0**. 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 **ITB 7**. Non-attendance at the pre-bid meeting will not be a cause for disqualification of a bidder.

6.6. 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.

6.7. 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.

7. **Amendment of Bidding Documents**

7.1. The procuring agency may issue notification of any change, addition, modification or deletion in accordance with the PP Rules 2004, rule no. 23 i.e. **Bidding Documents**.

7.2. 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:

Provided that the Procuring agency/Employer shall extend the deadline for submission of bid in pursuance of PP Rules 2004, rule no. 27 i.e. ***Extension of time for submission of bids****, if such an addendum is issued within last three (03) days of the bid submission deadline.*

C. PREPARATION OF BIDS

8. Language of Bid

8.1. 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 may be in another language provided they are accompanied by an accurate translation of the relevant pages in the English language unless specified in the **BDS**, in which case, for purposes of interpretation of the bidder, the translation shall govern.

9. **Documents Constituting the Bids**

9.1. The Bids prepared by the Bidder shall constitute of all the documents required in the **BDS**.

10. **Documents Establishing Eligibility of Material, Equipment and Works, their Conformity to Bidding Documents**

10.1. The bid prepared by the bidder shall constitute the following components: -

10.1.1. Documentary evidence established in accordance with **ITB 10** that the material and equipment to be utilized by the Bidder for the executions of works are eligible material and equipment and conform to the Bidding Documents;

10.1.2. Documentary evidence established in accordance with **ITB 11** that the bidder has been authorized to carry out the Construction works;

10.1.3. Documentary evidence established in accordance with **ITB 11** that the bidder is eligible and/or qualified for the subject bidding process;

10.1.4. Form of Bid and Bid Prices completed in accordance with **ITB 12** and **13**;

10.1.5. Completed schedules as required, including priced Bill of Quantities in accordance with **ITB 13**.

10.1.6. Technical Proposal completed in all aspects in accordance with **ITB-15**.

10.1.7. Bid security or Bid Securing Declaration furnished in accordance with **ITB 17**;

10.1.8. Any other document required in the **BDS**.

10.2. 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.

10.3. 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.

10.4. 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:

10.4.1. a detailed description of the work methodology, approach, schedule and resources to be mobilized at site;

10.4.2. an item-by-item commentary on the Procuring agency/Employer's Technical Specifications demonstrating substantial responsiveness of the material, equipment and works to those specifications, or a statement of deviations and exceptions to the provisions of the Technical Specifications;

10.4.3. any other procurement specific documentation requirement as stated in the **BDS**.

10.5. 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.

11. Documents Establishing Eligibility and Qualification of the Bidder

11.1. 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.

11.2. 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".

11.3. 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:

11.3.1. 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 **BDS**.

11.3.2. 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.

11.3.3. That the bidder meets the qualification criteria listed in Section-V, Evaluation and Qualification Criteria and **BDS**.

12. **Forms of Bid**

12.1. The Bidder shall fill the Form of Bids furnished in the bidding documents. The Bids Form must be completed without any alterations to its format and no substitute shall be accepted.

13. **Bid Prices**

13.1. 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.

13.2. 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.

13.3. Items not listed in the Price Schedule shall be assumed not to be included in the bid, and provided that the bid is still substantially responsive in their absence or due to their nominal nature, the corresponding average price of the respective item(s) of the remaining substantially responsive bidder(s) shall be construed to be the price of those missing item(s):
Provided that:

13.3.1. where there is only one (substantially) responsive bidder, or

13.3.2. where there is provision for alternate proposals and the respective items are not listed in the other bids,

The Procuring agency/Employer may fix the price of missing items in accordance with market survey, and the same shall be considered as final price.

13.4. The Bid price to be quoted in the Form of Bid in accordance with ITB 12 shall be the total price of the bid.

13.5. Unless otherwise specified in the **BDS** 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.

13.6. If so specified in ITB 1.1, bids may be invited for individual lots (contracts) or for any combination of lots (packages).

13.7. 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 **ITB 27**, unless otherwise price adjustment is permissible under Conditions of the Contract.

13.8. 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.

14. **Currencies of Bid and Payment**

14.1. Prices shall be quoted in Pakistani Rupees unless otherwise specified in the **BDS**. Comparison of bids and tie of bid shall be treated in accordance with the PP rules 2004, rule no. 30.

15. **Documents Comprising the Technical Proposal**

15.1. The bidder shall furnish a Technical Proposal including a statement of work methods, equipment, personnel, schedule and any other information as stipulated in Section VII – Standard Bid Forms, in sufficient detail to demonstrate the adequacy of the bidder's proposal to meet the work requirements and the completion time.

16. **Bid Validity Period**

16.1. Bids shall remain valid for the period specified in the BDS 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.

16.2. Under exceptional circumstances, prior to the expiration of the initial Bids/Bid validity period, the Procuring Agency may request the Bidders' consent to an extension of the period of validity of their Bids/Bid. Such request for extension of the period of bid validity shall be carried out in accordance with the PP rules 2004, rule no. 26 i.e. Bid Validity.

17. **Bid Security or Bid Securing Declaration**

17.1. Pursuant to ITB 11.1 unless otherwise specified in the BDS, the bidder shall furnish as part of its bid, a Bid Security in accordance with the PP Rules 2004, rule no. 25 in the amount and currency specified in the BDS or Bid Securing Declaration as specified in the BDS in the format provided in Section VII (Standard Bidding Forms).

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.

Until the development of functionality of auto verification of financial instrument in **EPADS v2.0**, the scanned copy of bid security or bid securing declaration, as the case may be, shall be uploaded on **EPADS v2.0** whereas the original instrument to be submitted to the procuring agency before closing of bid submission deadline,

17.2. The Bid Security shall be denominated in the local currency or in another freely convertible currency, and it shall be in the form specified in the BDS which shall be in any of the following:

17.2.1. 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;

17.2.2. A cashier's or certified cheque; or

17.2.3. Another security as indicated in the **BDS**.

17.3. The Bid Security or Bid Securing Declaration shall be in accordance with the Form of the Bid Security or Bid Securing Declaration included in Section VII (Standard Bidding Forms) or another form approved by the Procuring agency/Employer prior to the bid submission.

17.4. The Bid Security shall be payable promptly upon written demand by the Procuring agency/Employer in case any of the conditions listed in **ITB 17.9** are invoked.

17.5. Any bid not accompanied by a Bid Security or Bid Securing Declaration in accordance with **ITB 17.1 or 17.3** shall be rejected by the Procuring agency/Employer and shall be declared as non-responsive bid, pursuant to **ITB 27**.

17.6. 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 **ITB 16**. The Procuring agency/Employer shall make no claim to the amount of the Bid Security, and shall promptly return the Bid Security document, after whichever of the following that occurs earliest:

17.6.1. The expiry of the Bid Security;

17.6.2. 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 Biding documents;

17.6.3. The rejection by the Procuring agency/Employer of all Bids;

17.6.4. The withdrawal of the bid prior to the deadline for the submission of bids, unless the biding documents stipulate that no such withdrawal is permitted.

17.7. The successful bidder's Bid Security will be discharged upon the bidder signing the contract pursuant to **ITB 40**, or furnishing the performance security (or guarantee), pursuant to **ITB 41**.

17.8. The Bid Security may be forfeited or the Bid Securing Declaration executed:
if a Bidder:

17.8.1. 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 ITB 16.2; or

17.8.2. In the case of a successful bidder, if the bidder fails:

17.8.2.1. to sign the contract in accordance with ITB 40; or

17.8.2.2. to furnish performance security (or guarantee) in accordance with ITB 41.

17.9. 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. In case the JV is not legally constituted at the time of bid submission, the bid security or bid securing declaration shall be in the names of all future members as named in the letter of bid.

18. **Withdrawal of Bids**

18.1. 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.

19. **Format and Signing of Bid**

19.1. The Bidder shall prepare and submit Bids through EPADS with due diligence after carefully reading all the terms and condition before bid submission deadline.

D. SUBMISSION OF BIDS

20. **Submission of Bids**

20.1. All bids shall be submitted through **EPADS v2.0**.

21. **Deadline for Submission of Bids**

21.1. All bids shall be received through **EPADS v2.0** not later than bid submission deadline as specified in the **BDS**.

21.2. The Procuring agency/Employer may, under exceptional circumstances and at its discretion, extend the deadline for the submission of bids, pursuant to PP Rules 2025, rule no.39 Extension of Time for submission of bid, by amending the Bidding Documents in accordance with ITB 7, 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.

22. **Substitution and Modification of bids**

22.1. 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.

22.2. Revised bid may be submitted after the substitution or modification made in the original bid in accordance with the provisions referred in ITB 18.

E. OPENING AND EVALUATION OF BIDS

23. **Opening of Bids**

23.1. The Procuring Agency will open bids in accordance with the PP rules 2004, rule no 28 and as specified in the **BDS**.

24. **Confidentiality**

24.1. 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.

25. **Clarification of Bids**

25.1. Clarification of Bidding Documents shall be carried out in accordance with the PP Rules 2025, rule no 38 i.e. Clarifications.

25.2. 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:

25.2.1. evaluation & qualification criteria;

25.2.2. required scope of work;

25.2.3. contract price;

25.2.4. all securities requirements;

25.2.5. tax requirements;

25.2.6. terms and conditions of bidding documents.

25.2.7. change in the ranking of the bidder

26. **Preliminary Examination of Bids**

26.1. Prior to the detailed evaluation of bids, the Procuring agency/Employer will determine whether each bid:

26.1.1. meets the eligibility criteria defined in ITB 3 and ITB 4;

26.1.2. has been prepared as per the format and contents defined by the Procuring agency/Employer in the bidding documents;

26.1.3. has been properly signed;

26.1.4. is accompanied by the required securities; and

26.1.5. is substantially responsive to the requirements of the bidding documents.

The Procuring agency/Employer's determination of a bid's substantial responsiveness will be based on the contents of the bid itself.

26.2. A substantially responsive Bid is one which conforms to all the terms, conditions, and specifications of the Bidding Documents, without material deviation or reservation. A material deviation or reservation is one that: -

26.2.1. affects in any substantial way the scope, quality, or performance of the Works;

26.2.2. limits in any substantial way, inconsistent with the bidding documents, the Procuring agency/Employer's rights or the bidders' obligations under the Contract; or

26.2.3. if rectified, would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

26.3. The Procuring agency/Employer will confirm that the documents and information specified under ITB 9, 10 and 11 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.

26.4. The Procuring agency/Employer may waive-off any minor informality, nonconformity, or irregularity in a bid which does not constitute a material deviation, provided such waiver does not prejudice or affect the relative ranking of any Bidder.

Explanation: 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 –

26.4.1. Submit the number of copies of signed bids required by the invitation;

26.4.2. Furnish required information concerning the number of its employees;

26.4.3. 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.

26.5. 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.

26.6. 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.

26.7. 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.

27. **Examination of Terms and Conditions; Technical Evaluation**

27.1. The Procuring agency/Employer shall examine the bid to confirm that all terms and conditions specified in the GCC and the PCC have been accepted by the bidder without any material deviation or reservation.
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.

27.2. The Procuring agency/Employer shall evaluate the technical aspects of the bid submitted in accordance with ITB 30, to confirm that all requirements specified in Section VI – Works Requirement, Technical Specifications of the Bidding Documents have been met without material deviation or reservation.

27.3. 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 ITB 27, it shall reject the bid.

28. **Correction of Arithmetic Errors**

28.1. Bids determined to be substantially responsive will be checked for any arithmetic errors. Errors will be corrected as follows: -

28.1.1. 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;

28.1.2. 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

28.1.3. where there is a discrepancy between the amounts in figures and in words, the amount in words will govern.

28.1.4. 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.

28.2. The amount stated in the Bid will, be rectified by the Procuring agency/Employer in accordance with the above procedure for the correction of errors and, with, the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected amount, its bid shall be rejected after forfeiture of Bid Security or execution of the Bid Securing Declaration, as the case may be, in accordance with ITB 41.3.

29. **Conversion to Single Currency**

29.1. 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. Comparison of bids quoted in different currencies and conversion of bids into a single currency shall be carried out in accordance with the PP Rule 2004, rule no. 30 (2).

30. **Evaluation of Bids**

30.1. The Procuring agency/Employer shall evaluate and compare only the bids determined to be substantially responsive, pursuant to ITB 27.

30.2. In evaluating the Technical Proposal of each Bid, the Procuring agency/Employer shall use the criteria and methodologies listed in the BDS and in terms of works requirement. No other evaluation criteria or methodologies shall be permitted.

30.3. The Procuring agency/Employer's evaluation of a bid will take into account:

30.3.1. 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;

30.3.2. converting the amount resulting from applying above, if relevant, to a single currency in accordance with ITB 29;

30.4. 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.

30.5. 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 BDS.

30.6. If the bid, which results in the Evaluated Bid Price (Successful 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.

Explanation:

“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.

31. **Domestic Preference**

31.1. If the BDS 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.

32. **Determination of Successful Bid**

32.1. The Procuring agency/Employer shall compare the evaluated bids in accordance with the predefined bidding procedure, of all substantially responsive bids to determine the Successful bidder.

33. **Qualification of Bidder**

33.1. The Procuring agency/Employer shall determine to its satisfaction whether the bidder is substantially responsive and whose bid is declared as Successful bid either continues to meet (if prequalification applies) or meets (if post-qualification applies) the qualifying criteria specified in Evaluation and Qualification Criteria.
Note: In case of international bidding, the parameters for incorporation or licensing within Pakistan may be fulfilled as part of post qualification.

33.2. The determination shall be based upon an examination of the documentary evidence of the bidder’s qualifications submitted by the bidder, pursuant to ITB 11.

33.3. 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.

34. **Sub-Contractors**

34.1. 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.

34.2. Bidders may propose sub-contracting up to the percentage of total value of contracts or the volume of works as specified in the BDS.

35. **Abnormally Low Financial Bid**

35.1. A procuring Agency may reject abnormally low bids in accordance with the PP Rules 2025 rule no. 43. 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. Moreover, the Procuring agency/Employer shall not incur any liability solely by rejecting abnormally bid

Guidance for Procuring agency/Employer:

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. In order to identify the Abnormally Low Bid (ALB) following approaches can be considered to minimize the scope of subjectivity:

35.1.1. Comparing the bid price with the cost estimate;

35.1.2. Comparing the bid price with the bids offered by other bidders submitting substantially responsive bids; and

35.1.3. Comparing the bid price with prices paid in similar contracts in the recent past either government- or development partner-funded.

35.2. The Procuring agency/Employer will determine to its satisfaction whether the bidder that is selected as having submitted the successful bid is qualified to perform the contract satisfactorily, in accordance with the criteria listed in ITB 11

35.3. The determination will take into account the bidder's financial and technical capabilities. It will be based upon an examination of the

documentary evidence of the bidder's qualifications submitted by the bidder, pursuant to ITB 11, 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.

35.4. Procuring agency/Employer may seek "Certificate for Independent Price Determination" from the bidder and the results of reference checks may be used in determining award of contract.

Explanation: *The Certificate shall be furnished by the bidder. The bidder shall certify that the price is determined keeping in view of all the essential aspects such as raw material, its processing, value addition, optimization of resources due to economy of scale, transportation, insurance and margin of profit etc.*

35.5. An affirmative determination will be a prerequisite for award of the contract to the bidder. A negative determination will result in rejection of the bidder's bid, in which event the Procuring agency/Employer will proceed to the next ranked bidder to make a similar determination of that bidder's capabilities to perform satisfactorily.

F. AWARD OF CONTRACT

36. **Criteria of Award**

36.1. Subject to ITB 36 and 37, 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 Successful Bidder, provided that such bidder has been determined to be:

36.1.1. eligible in accordance with the provisions of ITB 3;

36.1.2. is determined to be qualified to perform the Contract satisfactorily; and

36.1.3. Successful negotiations have been concluded, if any.

37. **Negotiations**

37.1. The Committee of the Procuring agency/Employer may negotiate with the Most Advantageous Bidder relating to the following areas:

37.1.1. a minor alteration to the technical (drawings, design technical specifications) details of the statement of works;

37.1.2. Methodology, work plan, staffing in view to streamline the work;

37.1.3. a minor amendment to the Particular conditions of Contract;

37.1.4. finalizing payment arrangements;

37.1.5. clarifying details that were not apparent or could not be finalized at the time of Bidding;

37.2. 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.

38. **Procuring agency/Employer's Right to reject All Bids**

38.1. The procuring agency has the right to reject all bids in accordance with the PP Rules 2025 rule no. 45. However, the Authority (i.e. PPRA) may call from the Procuring agency/Employer the justification of those grounds.

39. **Notification of Award**

39.1. The procuring agency shall announce and publish the evaluation result in accordance with the PP Rules 2004, rule no. 40.

39.2. Where no complaints have been lodged, the bidder whose bid has been accepted will be notified of the award by the Procuring agency/Employer prior to expiration of the bid validity period through EPADS. However, the Procuring agency/Employer shall not award any procurement contract at least for five (05) days after the announcement of final evaluation report. 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).

39.3. The notification of award will constitute the formation of the Contract, subject to the bidder furnishing the Performance Security (or guarantee) in accordance with ITB 41 and signing of the contract in accordance with ITB 40.

39.4. Upon the successful bidder’s furnishing of the performance security (or guarantee) pursuant to ITB 41, 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 ITB 17.

40. **Signing of Contract**

40.1. 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.

40.2. Immediately after the Redressal of grievance by the GRC, and after fulfillment of all conditions precedent of the Contract Form, the successful bidder and the Procuring agency/Employer shall sign the contract.

40.3. Where no formal signing of a contract is required, work order issued to the bidder shall be construed to be the contract.

41. **Performance Security (or Guarantee)**

41.1. 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 BDS and PCC, denominated in the type and proportions of currencies in the Letter of Acceptance and in accordance with the Conditions of Contract.

41.2. If the Performance Guarantee is provided by the successful bidder and it shall be in the form specified in the BDS which shall be in any of the

following:

41.2.1. certified cheque, cashier’s or manager’s cheque, or bank draft;

41.2.2. 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;

41.2.3. bank guarantee confirmed by a reputable local bank or, in the case of a successful foreign bidder, bonded by a foreign bank; or

41.2.4. surety bond callable upon demand issued by any reputable surety or insurance company.
Any Performance Guarantee submitted shall be enforceable in Pakistan.

41.3. Failure of the Most Advantageous Bidder to comply with the requirement of ITB 40 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).

42. **Advance Payment**

42.1. 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.

42.2. 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 PCC.

43. **General Performance of the Bidders**

43.1. 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.

44. **Corrupt & Fraudulent Practices**

44.1. 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.

G. GRIEVANCE REDRESSAL & COMPLAINT REVIEW MECHANISM

45. Grievance Redressal

45.1. Grievance Redressal shall be carried out in accordance with the PP Rules 2025, rule no. 65 i.e. Redressal of grievances by the procuring agency and “Redressal of Grievances Regulations 2021”.

H. MECHANISM OF BLACKLISTING

46. Mechanism of Blacklisting

46.1. The Procuring agency/Employer shall proceed Blacklisting of Bidders/Contractors in accordance with PP Rules 2025, rule no.25 i.e. Blacklisting and “Blacklisting and Debarment of Bidders or Contractors Regulations 2024.

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.

A. Introduction

ITB Number
Amendments of, and Supplements to, Clauses in the Instruction to Bidders

ITB Number1.1

Name of Procuring agency/Employer: **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority)**

The subject of procurement is: **ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES**

Period for completion of the works **1 Years**

Commencement date execution of the works: **14 Days**

Type of Procurement**:Local**

ITB Number2.1

Financial year for the operations of the Procuring agency/Employer: **2026-27**
Name of Project [insert: name and summary description of the Project if any]

Name of financing institution: [insert: name if any]

Name and identification number of the Contract: **P114094**

ITB Number3.1

JV/Consortium or Association Allowed: **Yes**

Maximum number of members in the joint venture shall be: **2**.

B. Bidding Documents

ITB Number6.4

The Bidders may seek clarifications through **EPADS v2.0**: **Last Clarification Date: Saturday, September 19, 2026**
Pre-Bid Meeting: Wednesday, September 23, 2026 12:00 PM

C. Preparation of Bids

ITB Number8.1

The Language of all correspondences and documents related to the Bid is: **English**

ITB Number 5.1 & 9.1

The following documentsmust be includedto constitute the Bid

No

ITB Number9.4 (b)

Other procurement specific documentation requirements are:

As per Attached Annexures

ITB Number12.4

The Bid price will be/will not be subject to the price adjustment **Yes**
Price Adjustment Annexure is attached in the Annexure Section with the name of Adjustment Data.

ITB Number12.6

The Bid price shall be adjusted in accordance with Schedule-A to Bid – “Schedule of Adjustment Data” if available.

ITB Number13.1

Bidders to quote entirely in**Pak rupees (PKR)**

Schedule of Adjustment Data for Local Currency (LC)

Index Code	Index Description	Source of Index	Weighting
1	Non-adjustable	---	0.36

Index Code	Index Description	Source of Index	Weighting
2	Local Labour	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.	0.25
3	Cement – in bags. Portland cement shall be considered representative items for all types of cement.	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.	0.09
4	Steel Reinforcement	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.	0.1
5	High Speed Diesel (HSD)	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.	0.2
	Total	Rupees	1.00

ITB Number15.1

The Bid Validity period shall be **152 Days** days.

ITB Number16.1

The amount of Bid Security shall be (insert amount)

The currency of the Bid Security shall be: **PKR**.

ITB Number16.2

The Bid Security shall be in the form of:**Pay Order, Bank Guarantee**

D. Submission of Bids

ITB Number19.1

The deadline for Bid submission is:**Thursday, October 1, 2026 12:00 PM**
Address for submission of Original Bid Security:**Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province).**

ITB Number21.1
The Bid opening shall take place at:**EPADS v2.0**
Day : ***Thursday***
Date: ***October 01, 2026***
Time : ***12:30 PM***

ITB Number27.1
The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid prices expressed in various currencies is: **PKR Only**
The source of exchange rate shall be: **Nil**
The date of exchange rate shall be: **Nil**

ITB Number28.2 &28.5
Least Cost Based Selection (LCBS)
see Evaluation Criteria

ITB Number29.1
Domestic preference to apply.
Domestic preference:**No**
Preference to domestic or national suppliers or contractors shall be provided in accordance with policies of the Federal Government and/or in accordance with the regulations issued by the Authority.
If Yes, The percentage for the domestic preference alongwith calculation formula is provided in the evaluation and qualification criteria.

ITB Number32.2
Sub-contracting is allowed? : **Yes**

10% of the total value of the contract.

39.1 The Performance Security (or guarantee) shall be **10.00%**
39.2 The Performance Security (or guarantee) shall be in the form of:**Pay Order,Bank Guarantee**

Eligibility Criteria

Bidder's Type	Required Registration
Individual / Individual Consultant	NADRA CITIZENSHIP (CNIC/NICOP)
Sole Proprietorship	FBR (NTN)
Partnership Firm	FBR (GSTN)
Company (Private Limited)	PEC

Eligibility Criteria	Document
a) Bidders applying individually shall have valid registration with Pakistan Engineering Council in Category C-3 or above and at least in Specialization Codes CE03 & CE10. In case of a Joint Venture, each partner shall have valig registration with Pakistan Engineering Council in Category C-3 or above and the JV partners collectively shall have at least in Specialization Codes CE03 & CE10.	Yes
b) Provision of valid NTN certificate from Federal Board of Revenue to confirm status of being an active tax-payer.	Yes
c) Provision of valid sales tax certificate from Sindh Revenue Board to confirm status of being an active tax-payer.	Yes
d) Provision of following affidavits (on non-judicial stamp paper): i) An affidavit to the effect that the bidder has never been black-listed by any previous employer.	Yes
d) Provision of following affidavits (on non-judicial stamp paper): ii) An affidavit to the effect that all documents / particulars / information given with these documents are true.	Yes
d) Provision of following affidavits (on non-judicial stamp paper):iii) An affidavit to the effect that the bidder has never indulged in corrupt, fraudulent or collusive practice for procuring contracts.	Yes

d) Provision of following affidavits (on non-judicial stamp paper):iv) An affidavit to the effect that the bidder is not presently involved nor has been in the past in litigation with its employers. Should this be otherwise the bidder must provide such details in Form A-8 “Litigation orArbitration/Disputes History”.	Yes
d) Provision of following affidavits (on non-judicial stamp paper):v) An affidavit to the effect that the bidder is not on the list of debarred/ blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and not having been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.	Yes
e) Provision of Declaration of Beneficial Ownership Information duly completed and signed in the prescribed proforma (Form A-1(b)).	Yes
f) Provision of verifiable audited balance sheets of last three (03) years.	Yes
g) Provision of at least one (1) similar nature work, i.e. repair, rehabilitation, or construction of a reinforced concrete jetty or other marine structure, such as jetties and wharves, quay walls, piers and berths, dolphins (mooring/breasting), breakwaters and seawalls, revetments, or groynes, completed within the last ten (10) years, with a contract value of Rs. 300 million or above.	Yes
h) All above requirements shall be fulfilled by every firm individually in a Joint Venture (JV), except Sub-Para 3.2.2(a) and 3.2.2(g) to qualify for further detailed evaluation.	Yes
i) All the Bidders must be registered on the E-Pak Acquisition and Disposal System (E-PADS Version 2.0)	Yes
j) In case of Joint Venture (JV), the JV partners must be registered jointly on EPADS Version 2.0 as JV partners. In case of non-compliance, the bid shall be rejected.	Yes

Evaluation Criteria

Least Cost Based Selection (LCBS)

Weightage

Technical Evaluation %
100

Technical Marks	100
Passing Marks	**65**
3.2.4.1 Financial Capacity (Minimum acceptable is 50 percent marks)(As mentioned in Annexure-I (Volume-I, Para # 3.2.3 & 3.2.4.1)	
(a) Available Bank Credit Line (latest) (Quantitative)(Doc Required) Full marks will be given in case of credit line limit ≥ Pak Rs 350 million. **(3)** Two (02) mark will be given if the available bank credit line limit is equal to Pak Rs 250 million. **(2)** One (01) mark will be given if the available bank credit line limit is equal to Pak Rs 150 million. **(1)**	3

b) Average Working Capital (from Audited Balance Sheets of last three (03) years) (Quantitative)(Doc Required) Full marks will be given in case of average working capital ≥ Pak Rs 400 million. **(12)** Eleven (11) marks will be given if the average working capital for last three years is equal to Pak Rs 350 million. **(11)** Ten (10) marks will be given if the average working capital for last three years is equal to Pak Rs 300 million. **(10)** Nine (09) marks will be given if the average working capital for last three years is equal to Pak Rs 250 million. **(9)** Eight (08) marks will be given if the average working capital for last three years is equal to Pak Rs 200 million. **(8)** Seven (07) marks will be given if the average working capital for last three years is equal to Pak Rs 150 million. **(7)** Six (06) marks will be given if the average working capital for last three years is equal to Pak Rs 100 million. **(6)**	12

c) Average Annual Turnover (from Audited Balance Sheets of last three (03) years) (Quantitative)(Doc Required) Full marks will be given in case of Average Annual Turnover ≥ Pak Rs 450 million **(12)** Eleven (11) marks will be given if the average annual turnover for last three years is equal to Pak Rs 400 million. **(11)** Ten (10) marks will be given if the average annual turnover for last three years is equal to Pak Rs 350 million. **(10)** Nine (09) marks will be given if the average annual turnover for last three years is equal to Pak Rs 300 million. **(9)** Eight (08) marks will be given if the average annual turnover for last three years is equal to Pak Rs 250 million. **(8)** Seven (07) marks will be given if the average annual turnover for last three years is equal to Pak Rs 200 million. **(7)** Six (06) marks will be given if the average annual turnover for last three years is equal to Pak Rs 150 million. **(6)**	12
Income tax returns for the last 03 years. (Quantitative)(Doc Required)	3
3.2.4.2 Experience Capacity (Minimum acceptable is 50 percent marks)(As mentioned in Annexure-I (Volume-I, Para # 3.2.3 & 3.2.4.2)	

General civil works (General civil works carried out/ completed in last ten (10) years amounting to Rs 200 million or above.) (Quantitative)(Doc Required) More than one (01) **(10)** One (01) **(5)**	10
Similar Nature Works (Similar nature of works/ projects carried out/ completed in last ten (10) years amounting to Rs 300 million or above.) (Quantitative)(Doc Required) More than 02 **(30)** 02 **(20)** 01 **(10)**	30
3.2.4.3 Personal Capacity (Minimum acceptable is 50 percent marks)(As mentioned in Annexure-I (Volume-I, Para # 3.2.3 & 3.2.4.3)	
Project Manager (Civil) (General Experience) (Must be at least Bachelor’s Degree holder in Civil Engineering) (Quantitative)(Doc Required) More than 15 years **(2)** 10 to 15 years **(1)**	2

Project Manager (Civil) (Specific Experience in Marine Structures Works) (Must be at least Bachelor’s Degree holder in Civil Engineering) (Quantitative)(Doc Required) More than 10 years **(4)** 05 to 10 years **(2)**	4
Planning & Scheduling Engineer (Civil) (Specific Experience) (Must be at least Bachelor’s Degree holder in Civil Engineering and proficiency in Primavera, P6 Version) (Quantitative)(Doc Required) More than 10 years **(5)** 5 to 10 years **(3)**	5
Site Engineer (Civil) (Specific Experience in Marine Structures Works) (Must be at least Bachelor’s Degree holder in Civil Engineering) (Quantitative)(Doc Required) More than 10 years **(3)** 05 to 10 years **(2)**	3
Site Supervisor (Civil) (Specific Experience in Marine Structures Works) (Must be at least Diploma of Associate Engineer in Civil) (Quantitative)(Doc Required) More than 10 years **(2)** 05 to 10 years **(1)**	2

Quantity Surveyor (Must be at least Diploma of Associate Engineer in Civil) (Quantitative)(Doc Required) More than 10 years **(2)** 05 to 10 years **(1)**	2
Surveyor (Specific Experience in Marine Structures Works) (Must be at least Diploma of Associate Engineer in Civil/ Certificate holder in Surveying) (Quantitative)(Doc Required) More than 10 years **(2)** 05 to 10 years **(1)**	2
3.2.4.4 Equipment Capacity (Minimum acceptable is 50 percent marks)(As mentioned in Annexure-I (Volume-I, Para # 3.2.3 & 3.2.4.4)	
Floating Barge (Quantitative)(Doc Required) One Floating Barge Owned **(3)** One Floating Barge Rented/Leased **(2)**	3
One Crane with 25 to 30 tons Capacity (Quantitative)(Doc Required)	1
One Boat (Quantitative)(Doc Required)	1
One Concrete Mixer Machine (Quantitative)(Doc Required)	1

1000 sq-ft Scaffolding (Quantitative)(Doc Required) 1000 sq-ft Scaffolding Owned **(2)** 1000 sq-ft Scaffolding Rented/Leased **(1)**	2
Compressor 180 CFM or Above (Quantitative)(Doc Required) One Compressor 180 CFM or Above Owned **(2)** One Compressor 180 CFM or Above Rented/Leased **(1)**	2

Jobs/Lots

Lot Title : Bill of quantities

Bid Security : 10000000 PKR

Job	Delivery Schedule	Quantity
01-1C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1075/cubm	1075/cubm
01-2C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 50/cubm	50/cubm

Job	Delivery Schedule	Quantity
01-3C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 7915/sqm	7915/sqm
01-4C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 7915/sqm	7915/sqm
01-5C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 10/Qty	10/Qty
01-6C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 110/mt	110/mt
01-7C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 500/Ltr	500/Ltr
01-8C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 805/Ltr	805/Ltr
01-9C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1075/cubm	1075/cubm

Job	Delivery Schedule	Quantity
01-10C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 50/cubm	50/cubm
01-11C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 25/cubm	25/cubm
01-12C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/m	1/m
01-13C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Ltr	1/Ltr
01-14C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 7915/sqm	7915/sqm
01-15C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 3500/Kg	3500/Kg
01-16C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 42/cubm	42/cubm

Job	Delivery Schedule	Quantity
01-17C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 287/cubm	287/cubm
01-18C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 370/sqm	370/sqm
01-19C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 204/m	204/m
01-20C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 42/m	42/m
01-21C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 370/sqm	370/sqm
01-22C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 45/mt	45/mt
01-23C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 120/Ltr	120/Ltr

Job	Delivery Schedule	Quantity
01-24C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 72/Ltr	72/Ltr
01-25C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 42/cubm	42/cubm
01-26C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 180/cubm	180/cubm
01-27C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 433/mt	433/mt
01-28C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 120/cubm	120/cubm
01-29C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 72/sqm	72/sqm
01-30C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 5/cubm	5/cubm

Job	Delivery Schedule	Quantity
01-31C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 300/sqm	300/sqm
01-32C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/m	1/m
01-33C (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Kg	1/Kg
01-34C (a) (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Qty	1/Qty
01-34C (b) (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Qty	1/Qty
01-34C (c) (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Qty	1/Qty
01-34C (d) (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Qty	1/Qty

Job	Delivery Schedule	Quantity
01-34C (e) (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Qty	1/Qty
01-34C (f) (For details please refer to Annexure-V, Bill of Quantities)	**Address:** Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province). **Schedule:** 365 Days **Quantity:** 1/Qty	1/Qty

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Work Specifications and Market Rates

Lot Title: Bill of quantities

Specifications / Requirements:

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
1		C. CIVIL WORKS				
2		UNLOADING JETTY				
3		DEMOLISHING & DISMANTLING/ REMOVING Ref. Spec. No. 0200				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
4		Methodology for Repair Works: Details given in the drawings for damaged, deteriorated and repair works are schematic. A complete methodology, preparation of shop drawings showing deteriorated concrete surfaces, quantity and the sequence of work including dismantling, removal of deteriorated concrete, cleaning of existing rusted steel components and application of repair works as given in the repair scheme below & as given in drawings, formwork and shoring/ supporting system for existing structure, retain and provide support for existing utilities and poles etc; shall be submitted by the Contractor for Engineer's review and approval. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.				
5		Surface Preparation				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
6	01-1C	A- Beam/ Top, Sides & Bottom Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated existing reinforced cement concrete works at any depth & level after installation of temporary support for existing structural member, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	1,075		
7		B- Planks/ Slab/ Deck				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
8	01-2C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated existing reinforced cement concrete works at any depth & level, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	50		
9		C-Cleaning of Concrete with High Pressure Clean Water				
10	01-3C	Surface preparation of concrete for repairs including cleaning of concrete surfaces and flushing with high pressure clean water (minimum 200bar) with portable equipment, using potable water to remove all dirt, laitance, loose particles & contaminants etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	7915		

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
11	01-4C	Sand blasting and cleaning of existing corroded steel bars etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	7915		
12	01-5C	Removal of Jetty fixtures & other items including existing MS ladders at any depth and level, stacking of useable materials which shall be handed over to the Employer and disposal of debris/ unused/ demolished/ removed materials including loading, unloading and transporting etc. complete in all respects to designated places and up to any lead or areas inside the harbour limits at specified location or as directed by the Engineer and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during dismantling/ removal works.	No	10		
13		REINFORCEMENT				
14		Ref. Spec. No. 2200				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
15	01-6C	Providing, furnishing, cutting, bending, binding, welding, placing of reinforcing bars, anchors or inserts (ASTM A-706, Grade 60 deformed hot rolled billet steel bars), complete in all respects as specified and directed by the Engineer including all labor, material, equipment, tools or any incidental items required to complete the work satisfactorily.	tonne	110		
16	01-7C	Anchorage with epoxy chemical anchor Hilti-HIT RE- 500 / Fischer FIS-EM Plus or approved equivalent including drilling of holes in existing structures, fixing and fixing accessories etc., complete in all respects as shown on the drawings and specifications. (excluding the cost of steel rebar).	Litre	500		
17	01-8C	Supply and application of anti-corrosion primer CorrVerter / X-Treat RustRemover by X-Calibur or approved equivalent to cleaned and prepared reinforcement bars, in accordance with the manufacturer’s recommendations etc.; complete in all respects as shown in drawings and specifications and as directed by the Engineer.	Litre	805		
18		PLAIN AND REINFORCED CONCRETE				
19		Ref. Spec. No. 2100, 2300, 2330				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
20	01-9C	Repair of deteriorated Beams Repair with Class 'A2' (40 MPa) SCC (Self- Consolidating Reinforced Cement Concrete with reduced-size aggregate as per General Notes and Drawings), using specified cement, including PCEbased third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by XCalibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer’s specifications; to be pumped in a water tight formwork, etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	1075		

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
21	01-10C	Repair of deteriorated Slab/ Plank/ Deck Patch Repairs of deteriorated Slab/ Plank/ Deck with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing furnishing all materials, labour, equipment, tools and any identical work.	Cum	50		
22		Repair of deteriorated Pile Head/ Concrete Surfaces				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
23	01-11C	Patch Repairs of deteriorated Pile Head/ Concrete Surfaces with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Cum	25		
24		Crack Repair				
25		A- Preparation for Injection				
26	01-12C	Preparing for injection of Resin to cracks in concrete surfaces of structures including drilled packers, plugging and re-working after injection e.g. filling of holes with repair mortar and finish etc. complete in all respects.	Rm	Rate only		
27		B- Supply and Injection of SikaInject 232				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
28	01-13C	Supply, mixing and injection of resin SikaInject 232 or approved equivalent product including all associated works as describe in previous item etc. complete in all respects.	Litre	Rate only		
29	01-14C	Sealing of concrete surfaces by providing, furnishing and application of silane-based water repellent coating (Sikagard-705 L / X-Shield FluroSil 100 by XCalibur or approved equivalent) on the specified areas as per manufacturer's specifications and all as directed and approved by the Engineer including surface preparation, performance tests and all materials, labor, equipment, tools etc. necessary to complete the work satisfactorily.	Sqm	7915		
30		MISCLLENIOUS STEEL WORKS				
31		Ref. Spec. No. 3100				
32	01-15C	Supply, fabrication and installation of galvanized steel ladder, including anchor bolts, embedding, embedded parts, fixing and all fixing accessories etc., complete in all respects as per original (existing) design drawings available with the Employer or as shown on the drawings and as per specifications.	KG	3500		
33		APPROACH BRIDGE 1 & 2				
34		DEMOLISHING & DISMANTLING/ REMOVING				
35		Ref. Spec. No. 0200				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
36		Methodology for Repair Works				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
37		Details given in the drawings for damaged, deteriorated and repair works are schematic. A complete repair methodology, Shop Drawings showing deteriorated concrete surfaces, quantities and sequence of work shall be submitted by the Contractor for the Engineer's review and approval. Repair works shall be executed on Approach Bridge 1 and 2 separately, ensuring that only one bridge remains under repair at any time and the other one remains operational. The existing deck wearing surface, service channel, expansion joints, handrails, and associated components shall be carefully dismantled without damaging the top slab, precast planks, transoms/beams, reinforcement, pile caps, piles, or existing utility services. Damaged/ deteriorated precast planks shall be identified, marked on drawings, and submitted to the Engineer for approval. Approved planks, together with the overlying top slab, shall be isolated using a concrete saw cutter and removed carefully without affecting adjacent structural members or utilities. Temporary supports shall be provided for utilities, poles, and other elements requiring protection during the works. Pile heads and transoms shall be repaired in accordance with the approved unloading jetty beam repair methodology. New precast planks shall then be cast, cured, and installed over the repaired transoms. Upon completion, the existing handrails, expansion joints, and associated components shall be reinstated in accordance with the original drawings and verified site conditions. Shop drawings and installation details shall be submitted to the Engineer for review and approval before execution.				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
38		Surface Preparation				
39		A- Beam/ Transom - Top, Sides & Bottom				
40	01-16C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated existing reinforced cement concrete works at any depth & level, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	42		
41		B- Removal of Deck (Planks and Slab)				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
42	01-17C	Dismantling/removal of existing damaged/ deteriorated planks including overlaid top slab and other associated elements shall be carried out using saw cutter and in accordance with the approved methodology and with due care to prevent any damage to adjacent structural members, including existing planks, slabs, transom/ beam, pile cap, piles & their reinforcement, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure, services and temporary works during removing, cleaning and repair work.	Cum	287		
43		C-Cleaning of Concrete with High Pressure Clean Water				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
44	01-18C	Surface preparation of concrete for repairs including cleaning of concrete surfaces and flushing with high pressure clean water (minimum 200bar) with portable equipment, using potable water to remove all dirt, laitance, loose particles & contaminants etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	370		
45		Removal and reinstallation of existing hand rails				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
46	01-19C	Careful dismantling, safe removal, and reinstallation of existing hand rails including all associated structural components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including bolts, plates, members, anchors, fittings, etc.) as required; surface preparation and application of painting or protective coating to the railing, wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, specifications, and as directed by the Engineer. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Rm	204		
47		Removal and Reinstallation of Existing Expansion Joint				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
48	01-20C	Careful dismantling, safe removal, and reinstallation of existing expansion joints including all associated components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including neoprene, plates, members, anchors, fittings, etc.) as required or wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, specifications, and as directed by the Engineer. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Rm	42		
49	01-21C	Sand blasting and cleaning of existing corroded steel rebars etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	370		
50		REINFORCEMENT				
51		Ref. Spec. No. 2200				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
52	01-22C	Providing, furnishing, cutting, bending, binding, welding, placing of reinforcing bars, anchors or inserts (ASTM A-706, Grade 60 deformed hot rolled billet steel bars), complete in all respects as specified and directed by the Engineer including all labor, material, equipment, tools or any incidental items required to complete the work satisfactorily.	tonne	45		
53	01-23C	Anchorage with epoxy chemical anchor Hilti-HIT RE- 500 / Fischer FIS-EM Plus or approved equivalent including drilling of holes in existing structures, fixing and fixing accessories etc., complete in all respects as shown on the drawings and specifications. (excluding the cost of steel rebar).	Litre	120		
54	01-24C	Supply and application of anti-corrosion primer CorrVerter / X-Treat RustRemover by X-Calibur or approved equivalent to cleaned and prepared reinforcement bars, in accordance with the manufacturer’s recommendations etc.; complete in all respects as shown in drawings and specifications and as directed by the Engineer.	Litre	72		
55		PLAIN AND REINFORCED CONCRETE				
56		Ref. Spec. No. 2100, 2300, 2330				
57		Repair of deteriorated Transom/ Beam				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
58	01-25C	Repair with Class 'A2' (40 MPa) SCC (Self- Consolidating Reinforced Cement Concrete with reduced-size aggregate as per General Notes and drawings), using specified cement, including PCEbased third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by XCalibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer’s specifications; to be pumped in a water tight formwork, etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	42		

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
59	01-26C	Precast Planks Precast Class 'A2' (40 MPa) Reinforced Cement Concrete, using specified cement, including PCEbased third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by XCalibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer’s specifications etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	180		
60	01-27C	Launching of Planks Launching of planks etc.; by approved means over land, water, including all temporary works, etc., complete in all respects as per drawings and specifications.	tonne	433		

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
61	01-28C	Slab Class 'A2' (40 MPa) Reinforced Cement Concrete, using specified cement, including PCE-based thirdgeneration superplasticizer (SIKA ViscoCrete-58HTPK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer’s specifications etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	120		
62	01-29C	Supply and application of bonding agent SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by XCalibur or approved equivalent shall be applied on the old concrete surfaces and exposed steel reinforcement before application of top slab, in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Sqm	72		

EPADS

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
63	01-30C	Patch Repair of deteriorated Plank/ Slab/ Pile Head/ Transom / Concrete Surfaces Patch Repairs of deteriorated Pile Head/ Transom/ Concrete Surfaces with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / XRoc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Cum	5		
64	01-31C	Sealing of concrete surfaces by providing, furnishing and application of silane-based water repellent coating (Sikagard-705 L / X-Shield FluroSil 100 by XCalibur or approved equivalent) on the specified areas as per manufacturer’s specifications and all as directed and approved by the Engineer including surface preparation, performance tests and all materials, labor, equipment, tools etc. necessary to complete the work satisfactorily.	Sqm	300		
65		EXPANSION JOINT				

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
66		Ref. Spec. No. 2315				
67	01-32C	Supply and installation of Floor Expansion Joint including embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as shown on the drawings and as per specifications.	Rm	Rate only		
68		MISCLLENIOUS STEEL WORKS				
69		Ref. Spec. No. 3100				
70	01-33C	Supply, fabrication and installation of epoxy painted MS hand rails including embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as shown on the drawings and as per specifications. (excluding the cost of anchor bolts and epoxy chemical).	KG	Rate only		
71	01-34C	Providing and installation of anchor bolts (High Corrosion Resistant, HAS-U HCR, Grade 8.8) of the following diameters etc, complete in all respects as shown on the drawings and as per specifications.				
72	a)	10mm	No	Rate only		
73	b)	12mm	No	Rate only		
74	c)	16mm	No	Rate only		

Sr. No	Ref. No.	Description	Unit	Qty	Rate	Amount
75	d)	20mm	No	Rate only		
76	e)	24mm	No	Rate only		
77	F)	28mm	No	Rate only		
78		Total:				448614565
					GRAND TOTAL:	Rs448,614,565.00

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Scope of Work

Project envisages the establishment and upgradation of the jetty and all associated marine and landside structures, including civil, structural, and ancillary works necessary for full operational functionality. The Works include site preparation, construction, rehabilitation, installation of required fixtures, and integration with existing infrastructure. The Contractor shall ensure compliance with all technical specifications, safety standards, and regulatory requirements. All works shall be executed using approved methodologies, qualified personnel, and suitable equipment to achieve the intended performance and durability.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Price Schedule

For Individual Jobs

#	Job Title	Quantity	Unit Price (PKR)	Total Price (PKR)	Delivery Location	Delivery Period / Year	Country of Origin
1							
2							

For Lots

#	Lot Title	Total Lot Price (PKR)	Country of Origin
1	[Lot 1 Title]		

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

General Conditions of Contract

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.

The successful Bidder, upon contract award, shall be required to furnish two (02) copies of aforementioned “General Conditions” for incorporation in the Works Contract.

International Federation of Consulting Engineers (FIDIC) FIDIC
Bookshop – Box- 311 – CH – 1215 Geneva 15, Switzerland
Fax: +41 22 799 49 054
Telephone: **+41 22 568 0500**
E-mail: **fidic@fidic.org**
Website: www.fidic.org
FIDIC code: ISBN13: 978-2-88432-084-9

Special Conditions of Contract

PARTICULAR CONDITIONS OF CONTRACT (PCC)

Particular Conditions
(Mandatory Provisions not to be amended/substituted)

The Particular Conditions (PCC) complement the General Conditions (GCC) to specify dates, contractual requirements, and special circumstances related to the Works. The PCC consists of two parts, Part A - Contract Data and Part B - Special Provisions. The provisions to be found in the Special Provisions (Particular Conditions - Part B) take precedence over the equivalent provisions found under the same Sub-Clause number(s) in the General Conditions, and the provisions of the Contract Data (Particular Conditions - Part A) take precedence over the Special Provisions (Particular Conditions - Part B).

PART A - Contract Data

Sub-Clause 1.1.27
Defects Notification Period (DNP): **365** Days

Sub-Clause 1.1.31
Employer's name & address: **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority), Executive Engineer Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province).**

Sub-Clause 1.1.35
Engineer's name & address: M/s NESPAK Pvt Ltd

13th floor of the NICL Building on Abbasi Shaheed Road, off Shahrah-e-Faisal, Karachi

Sub-Clause 1.1.84
Time for Completion: **365** days for whole of the works

Sub-Clause 1.3 (a)(ii)
Agreed method of electronic transmission: Agreed
The Electronic Transmission Methods are Insert systems of electronic transmission, if any, at the time of signing of the Contract

Sub-Clause 1.3 (d)
Address of Empoyer for Communications: **Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province).**
Address of Engineer for Communications:

13th floor of the NICL Building on Abbasi Shaheed Road, off Shahrah-e-Faisal, Karachi

Address of Contractor for Communications: **----------**

Sub-Clause 1.4
Contract shall be governed by the law of: **Islamic Republic of Pakistan**
Ruling language: **English**
Language for communications: **English**

Sub-Clause 2.1
After receiving the Letter of Acceptance, the Contractor shall be given right of access to all or part of the Site

within: **14** days after Commencement Date

Sub-Clause 2.4
Employer's financial arrangements:

The Employer's own resources, loans
or grants.

Sub-Clause 3.2 (e)(ii)
Engineer's Duties and Authority: **Variation resulting in an increase of the Accepted Contract Amount in excess ofone percent (1%)subject to accumulative Variations not exceeding five percent (5%)of the Accepted Contract Amount**

Sub-Clause 4.2
Performance Security (as percentage of the Accepted Contract Amount in Currencies): 10.00%
Form of Performance Guarantee: **Pay Order, Bank Guarantee**

Sub-Clause 4.2.1
List of Insurance Companies:

The Performance Security shall be, issued in the prescribed form included in the Bidding Documents, from Karachi based branch of any schedule bank in Pakistan with at least long term AAA PACRA/ VIS rating.

Sub-Clause 4.7.2
period for notification of errors in the items of reference: **Twenty Eight (28) days**

Sub-Clause 4.19
Period of payment for temporary utilities: **Each Month**

Sub-Clause 5.1 (a)
Maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount): **10** %

Sub-Clause 5.1 (b)
Parts of the Works for which subcontracting is not permitted: 1

None

Sub-Clause 6.5
Normal working hours on the Site: **08**

Sub-Clause 8.3
Number of additional paper copies of programmes: **03**

Sub-Clause 8.8 & 14.15(b)
Delay Damages payable for each day of delay **0.10**% of the Accepted Contract Amountfor delay in completion of whole of the Works

Sub-Clause 8.8
Maximum amount of Delay Damages **10.00 %** of the Accepted Contract Amount

Sub-Clause 8.14
Applicability of Incentives for Early Completion **No**

Sub-Clause 12.3
Percentage profit (Not more than 10%): **Nil**

Sub-Clause 13.4.(b)(ii)
Percentage rate to be applied to Provisional Sums for overhead charges and profit: **Twenty Five percent (25%)**

Sub-Clause 14.2
Total Advance Payment: **Fifteen percent (15%) of the Accepted Contract Amount excluding Provisional Sums payable in the currencies and proportions in which the Accepted Contract Amount is payable**

Sub-Clause 14.2.1
Advance Payment Insurance **Not Allowed**

Sub-Clause 14.2.3
Percentage deductions for the repayment of the Advance Payment: Deduction shall be made at the amortization rate of 17.5 % of the value of the Works executed of each IPC as provided in paragraph (i) of Sub-Clause GCC 14.3, starting from 2nd IPC provided that the advance payment shall be completely repaid prior to the time when 90% of the Accepted Contract Amount less Provisional Sums has been certified for payment. It may be more than 17.5% in the last instalment to ensure full repayment.

Sub-Clause 14.3
Period of payment **One Month**

Sub-Clause 14.3(b)
Number of additional paper copies of Statements: **3**

Sub-Clause 14.3 (iii)
Percentage of retention: **Seven percent (7%)**

Sub-Clause 14.3 (iii)
Limit of Retention Money (as a percentage of the Accepted Contract Amount): **Five percent (5%)**

Sub-Clause 14.5(b)(i)
Plant and Materials for payment when shipped: **Plant and Materials under Bill of "Imported Plant and Materials"**

Imported Plants and Materials

Not Applicable.

Sub-Clause 14.5(c)(i)
Plant and Materials for payment when delivered to the Site: Plant and Non Perishable Materials

Plants and Materials Onsite

As per the Employer's Recommendations.

Sub-Clause 14.6.2
Minimum amount of Interim Payment Certificate (IPC): **Yes**
The Minimum Amount IPC is 2
[Employer to give value not exceeding one fifth of the average expected value of Interim Payment

Certificate]

Sub-Clause 14.7(a)
Period of payment of Advance Payment to the Contractor**: 14 days**

Sub-Clause 14.7b(i)
Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6: **45** days

Sub-Clause 14.7b(ii)
Period for the Employer to make interim payments to the Contractor under Sub-Clause 14.13 (Final Payment)**: 45** days

Sub-Clause 14.7(c)
Period for the Employer to make final payment to the Contractor**: 56** days

Sub-Clause 14.8
Financing charges for delayed payment Local Currency (PKR):
6-Month KIBOR (Offer) +3% per annum.
Foreign Currency:
USD
6-Month SOFR (Secured Overnight Financing Rate for USD) +1% per annum.

EURO
6-Month EURIBOR (EURO Interbank Offered Rate for EURO) +1% per annum.

Others
Appropriate rates +1% (for other foreign currencies, Ref. Schedule-A, A-4 to Bid).

Sub-Clause 14.11.1(b)
Number of additional paper copies of draft Final Statements**: 6**
[insert number of copies say six (06)]

Sub-Clause 14.15
Currencies of payment of Contract Price: **as stated in the Table Schedule of Adjustment Data of Schedule A (if Given)**

Sub-Clause 14.15(a)(i)
Proportions or amounts of Local and Foreign currencies: **as stated in the Table Schedule of Adjustment Data of Schedule A (if Given)**

Sub-Clause 14.15(c)
Currencies and proportions for payment of Delay Damages: **as stated in the Table Schedule of Adjustment Data of Schedule A (if Given)**

Sub-Clause 14.15(f)
rates of exchange: **as stated in the Table IV of Schedule A (If Given)**

Sub-Clause 17.2(d)
Forces of nature, the risks of which are allocated to the Contractor: **Nil**

Sub-Clause 19.1
Permitted deductible limits:
i) insurance required for the Works: **Ten percent (10%) of loss amount on each & every loss**
ii) insurance required for Goods: **Nil**

iii) insurance required for liability for breach of professional duty: **Nil**
iv) insurance required against liability for fitness for purpose (if any is required): **Nil**
v) insurance required for injury to persons and damage to property: **Nil**
vi) insurance required for injury to employees: **Nil**
vii) other insurances required by Laws and by local practice : **Nil**

Periods for submission of insurance:
a) evidence of insurance: Not later than the Commencement Date
b) relevant policies: Within twenty eight (28) day from the Commencement Date

Sub-Clause 19.2.1(b)
Additional amount to be insured (as a percentage of the replacement value): 15% of the replacement value (Accepted Contract Amount)
Sub-Clause 19.2.2
Extent of insurance required for Goods: From Ex-Works (i.e., works, factory, warehouse, etc) to delivery at the Site
Amount of insurance required for Goods: Full replacement value

Sub-Clause 19.2.3(a)
Amount of insurance required for liability for breach of professional duty: Full replacement value of the Works to be designed by the Contractor

Sub-Clause 19.2.3(b)
Insurance required against liability for fitness for purpose: **Yes**

Sub-Clause 19.2.3
Period of insurance required for liability for breach of professional duty: Until the date of issuance of Performance Certificate

Sub-Clause 19.2.4
Amount of insurance required for injury to persons and damage to property: Injury to person and Fatal case: in accordance with Workmen Compensation Act
Damage to Property: The Amount of Insurance Required for Person Injury is In accordance with Workmen Compensation Act
The Amount of Insurance Required for Damage to Property is 5000000 as per his assessment of the adjoining property(ies) other than the Works]
without limit to the number of incidents

Sub-Clause 19.2.6
Other insurances required by Laws and by local practice: All insurances as applicable, to the extent of execution of the project, under Federal and Provincial laws of Islamic Republic of Pakistan

Sub-Clause 21.1
Time for appointment of the DAAB: Within 28 days from the Commencement Date.
In case the Accepted Contract Amount is lesser than PKR one (01) billion, appointment of the DAAB shall be made when Dispute arises between the Parties.

Sub-Clause 21.1
The DAAB shall comprise 1
[insert either “a sole Member” or “Three Members”]
[For a Contract estimated to cost above PKR 2.5billion, the DAAB shall comprise of three members. For a Contract estimated to cost between PKR1billion and PKR2.5billion, the DAAB may comprise of three members or a sole member. For a Contract estimated to cost less than PKR1billion, a sole member is recommended.]

Sub-Clause 21.1
List of proposed members of DAAB
- proposed by Employer

To be inserted at the time of signing of the Contract

- proposed by Contractor
[to be inserted at the time of signing of the Contract]
1._____
2._____
3._____

Sub-Clause 21.2
Appointing entity (official) for DAAB members Managing Director Public Procurement Regulatory Authority (PPRA) or Chairman Pakistan Engineering Council (PEC) from the list of PEC approved arbitrators published at its website

Sub-Clause 21.6
Rules of Arbitration: PEC Rules of Conciliation and Arbitration or Pakistan Arbitration Act of 1940, if the former is inactive.
The place of Arbitration shall be in the Employer's country: **Karachi**
[Insert name of city]

Particular Conditions

PartB - Special Provisions

1.1 Definitions

1.1.76 "Specification"
Following is added at the end:
"and consists of two parts i.e.,
i) "Part A - Specific Provisions"; and
ii) "Part B - Technical Provisions"."

1.2 Interpretation

"and" is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j).
Sub-paragraph (k) is added:
"(k) The word "tender" is synonymous with "bid" the word tenderer with "bidder", the words "tender documents" with "bidding documents" and "Schedule of Prices" with "Bill of Quantities", as applicable."
1.5 Priority of Documents The documents listed at (a) through (k) of this Sub-Clause are deleted and substituted with the following:
(a) the Contract Agreement;
(b) the Letter of Acceptance;
(c) the Letter of Bid;
(d) the Particular Conditions Part A - Contract Data;
(e) the Particular Conditions Part B - SpecialProvisions;
(f) the General Conditions;

(g) the Specification Part A - SpecificProvisions;
(h) the Specification Part B- Technical Provisions;
(i) the Drawings;
(j) the completed Schedules to Bid includingBillof Quantities;
(k) the JV Undertaking (if the Contractor is a JV); and
(l) any other documents forming part of the Contract.
The addenda/corrigenda, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

1.6 Contract Agreement

In the last line of the 1st paragraph the text “shall be borne by the Employer” is substituted by “shall be reimbursed by the Employer to the Contractor”.

3.1 The Engineer

In sub-paragraph (a) the text “as defined in the Pakistan Engineering Council Act, 1975 (Act No.V of 1976)” are added after the words “professional engineer”.

3.2 Engineer’s Duties and Authority

The Engineer shall obtain the consent in writing of the Employer before taking action under the following Sub-Clauses of these Conditions:
(a) Consenting to the subcontracting of any part of the Works under Sub-Clause 5.1 [Subcontractors]
(b) Any action under Sub-Clauses 8.9 [Employer’s Suspension] and 8.12 [Prolonged Suspension]
(c) Issuance of “Taking Over Certificate” under Sub-Clause 10.1 [Taking Over the Works and Sections].
(d) Issuing the “Performance Certificate” under Sub-Clause 11.9 [Performance Certificate].
(e) Sub-Clause 13.1 [Right to Vary]: instructing a Variation, except;
(i) in an emergency situation as determined by the Engineer, or
(ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.
(f) Sub-Clause 13.3 [Variation Procedure]: approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.3.2 [Variation by Request for Proposal] or 13.2 [Value Engineering].
(g) Certifying release of second half of the Retention Money under Sub-Clause 14.9 [Release of Retention Money].
(h) Issuing Final Payment Certificate under Sub-Clause 14.13 [Issue of FPC].
(i)

Issue of FPC Sub Clauses

Please refer to Annexure-II .

*[insert Sub-Clause number (not Sub-Clause 3.7 [Agreement or Determination]
Any such requirement shall not be applied to any action by the Engineer under Sub-Clause 3.7 [Agreement or Determination], as stated in Sub-Clause 3.2 [Engineer’s Duties and Authority] of the General Conditions. Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

Following is added after the words “the Employer’s consent is required” in 4th paragraph:
“stating that the Employer’s consent has been obtained for that specified authority”

4.2 Performance Security

4.2.1 Contractor’s Obligations
The entity issuing the Performance Security and its form shall be as under:
The Performance Security shall be, at the option of the Contractor,issuedin the prescribed form included in the Bidding Documents,by(a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan or (c)an Insurance Companylisted in the Contract Data and rated by PACRA/VIS ofratingas provided in Table below:
Accepted Contract Amount (In Eq. PKR million) Minimum Rating of Insurance Companies
Up to 1000 A (+)
1001 to no limit AA
In case of Joint Venture, the Performance Security shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.
Following paragraph is added at the end of this Sub-Clause:
“The amount of Performance Security shall be reducedto 50%following issue of the Taking-Over Certificate for the whole of the Works under Clause 10 of Conditions of Contract.”

4.3 Contractor’s Representative

In second paragraphthe text “professional engineer as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976) (having temporary licence in case of foreign engineer under Section 12 of the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)” are added after the words “qualified, experienced”.
In the 3rd paragraph the words “28 days” are substituted by “14 days”. In 2nd line of 4thparagraph the text “or appoint a replacement” is substituted by “except appointment of a suitable temporary replacement is deployed at the Site”

4.4 Contractor’s Documents

4.4.2 As-Built Records
First paragraph is deleted and the text in the last paragraph is substituted with the following:
“The Contractor shall furnish to the Engineer 6 copies, one reproducible and one electronic copy(provided the Engineer has made available to the Contractor editable form of the Drawings)of all Drawings amended to conform to the Works as built.In case the Engineer does not make available to the Contractor editable form of the Drawings, the Contractor shall furnish to the Engineer as-built data for incorporation in the Drawings. Upon receipt of PDF versions of the as-built drawings prepared by the Engineer, the Contractor shall furnish to the Engineer 6copies and one reproducible of these Drawings.
The price of such Drawings shall be deemed to be included in the Contract Price.”
Following Sub-Clause is added:
4.4.4 ShopDrawings
The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract.
Review and approval by the Engineer shall not exceed 21 days and be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and the Engineer’s review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

4.8 Health and Safety Obligations

The following text is added at the end ofthis Sub-Clause:
In the event of work being carried out outside the normal working hours and in the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the

Works where the night work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer.

4.20 Progress Reports

At the end of sub-paragraph (g) the word "and" is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with ";", and the following new sub-paragraphs are added as:
(i) planned programme for the execution of the Works for next 56 days to enable the Engineer to determine its programme of inspection and testing;
(j) monthly summery of daily job record indicating weather conditions, deployment of Contractor's Equipment, labour employment, local material procurement and material import, if any; and
(k) salient contractual and project information.

5.1 Subcontractors

Add the following text at the end of paragraph (ii):
"underSchedule to Bid"
The following is added at the end of the last paragraph of Sub-Clause 5.1:
"All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under sub-paragraph (a) of Sub-Clause 15.2.3 [After Termination].
The Contractor shall give reasonable opportunity to contractors from Islamic Republic of Pakistan for subcontracts for the Works, and endeavour to employ such contractors as Subcontractors."

5.2 Nominated Subcontractors

5.2.2 Objection to Nomination
In sub-paragraph (c), "and" is deleted from the end of (i);
"." at the end of (ii) is replaced with: ", and".
The following is then added as (iii):
"(iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.2.3 [Payment to nominated Subcontractors]."

6.1 Engagement of Staff and Labour

The following paragraph is added at the end of the Sub-Clause:
"The Contractor shall, to the extent practicable and reasonable, employ staff (not less than 50%) and labour (not less than 85%) with appropriate qualifications and experience from sources within the Islamic Republic of Pakistan."

6.7 Health and Safety of Personnel

The existing text is substituted with the following:
"In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose. The Contractor shall also provide all other medical services and appoint a health and safety officer at Site if stated in the Specifications. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means."

6.8 Contractor's Superintendence

Insert at the end of sub-paragraph (a) of this Sub-Clause:
"or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"
The following text is added at the end of this Sub-Clause:
“The Contractor’s authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council.
The Contractor’s authorized representative at Site shall be authorized to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.”

6.12 Key Personnel

The following is inserted at the end of the last paragraph:
“If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.”
The following Sub-Clauses 6.13 to 6.26 are added at the end of Sub-Clause 6.12:

6.13 Foreign Personnel

The Contractor may bring in to the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use all reasonable endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor’s personnel.
The Contractor shall be responsible for the return of these personnel to the place where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

6.14 Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor’s Personnel for the purposes of or in connection with the Contract.

6.15 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor’s Personnel.

6.16 Measures against Insect and Pest Nuisance

The Contractor shall at all times take the necessary precautions to protect the Contractor’s Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.

6.17 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor’s Personnel.

6.18 Arms and Ammunition

The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.

6.19 Festivals and Religious Customs

The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.

6.20 Funeral Arrangements

The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.

6.21 Forced Labour

The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.

6.22 Child Labour

The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in Islamic Republic of Pakistan.

6.23 Employment Records of Workers

The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [Contractor's Records].

6.24 Workers' Organizations

The Contractor shall comply with the relevant labour laws of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.

6.25 Non-Discrimination and Equal Opportunity

The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.
Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure nondiscrimination and equal opportunity, including for specific groups such as women, persons with disabilities, migrant workers and children (of working age in accordance with Sub-Clause 6.22).

6.26 Epidemics

In the event of any out-break of illness of epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or

sanitary authorities for the purpose of overcoming the same.

7.7 Ownership of Plant and Materials

The following is added before the first paragraph:
“Except as otherwise provided in the Contract,”
The following is added at the end of the Sub-Clause:
"No Plant and/or Materials that is the property of the Employer shallbe removed from the Site. If it becomes necessary to:
(i) remove any item of such Plant from the Site for the purposesof repair, the Contractor shall give a Notice, with reasons, tothe Engineer requesting consent to remove the defective ordamaged item off the Site. This Notice shall clearly identifythe item of defective or damaged Plant, and shall give detailsof: the defect or damage to be repaired; the place to whichdefective or damaged item of Plant is to be taken for repair;the transportation to be used (and insurance cover for suchtransportation); the proposed inspections and testing off theSite; and the planned duration required before the repaireditem of Plant shall be returned to the Site. The Contractorshall also provide any further details that the Employer mayreasonably require; or
(ii) replace any item(s) of such Plant and/or Materials, theContractor shall give a Notice, with reasons, to the Engineerclearly identifying the item(s) of Plant and/or Materials to bereplaced, and giving details of the due date of delivery tothe Site of the replacement item(s).
Where any item of Plant and/or Materials has become the propertyof the Employer under this Sub-Clause before it has been deliveredto the Site, the Contractor shall ensure that such an item is notmoved except for its delivery to the Site.
The Contractor shall indemnify and hold the Employer harmlessagainst and from the consequences of any defect in title orencumbrance or charge (except any reasonable restrictionarising from the intellectual property rights of the manufacturer orproducer) on any item of Plant and/or Materials that has becomethe property of the Employer under this Sub-Clause."
The following Sub-Clause7.9 is added after Sub Clause 7.8:

7.9 Use of Pakistani Materials and Services

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

8.1 Commencement of Works

The following is added before the first paragraph:
“After signing of the Contract Agreement by both Parties,” and thereafter the word “The” is replaced with the word “the”.

8.5 Extension of Time for Completion

The following is added after paragraph (c):
“for last five years”.
The following Sub-Clause 8.14 is added after Sub-Clause 8.13:

8.14 Incentives For Early Completion

If Contract Data does not state applicability of incentives for early completion, this Sub-Clause shall not apply.
The Contractor shall be entitled subject to Sub-Clause 20.2 [Claims for Payment and/or EOT] to bonus payment if the Works and/or each Section is completed earlier than the Time for Completion for the Works or Section (as the case may be). The amount of bonus for early completion of the Works and/or each Section shall be upto a limit and at a rate to 50% of the relevant limit and rate of delay damages prescribed in

Contract Data and shall be paid for every day which shall elapse between the relevant Date of Completion of the Works or Section and the relevant Time for Completion.
For the purposes of calculating any bonus payment, the applicableTime for Completion stated in the Contract Data is fixed and noadjustments of this time by reason of granting an EOT will beallowed.
The following Sub-Clause 11.12 is added after Sub-Clause 11.11:

11.12 Supervisory Assistance During DNP

If provided under the Schedule of Prices, the Contractor shall provide supervisory assistance to the Employer during the DNP for the Works. Such supervisory assistance shall be as described in the Specification for the purpose of supporting the Employer's operation and maintenance of the Plant for the period specified in the Schedule of Prices after the Date of Completion.

12.2 Method of Measurement

The following paragraph is added at the end of the Sub-Clause:
“Summary of measured quantity for payment shall be delineated item-wise under four headsnamely; “Schedule of Prices Quantity”, “Quantity Executed To-date”, “Quantity Certified Previously” and “Net Quantity Executed under this Certificate”.

12.3 Valuation of the Works

The following text is added at the end of fifth paragraph of the Sub-Clause:
“Sum of overhead charges and profit for sub-paragraph (a) shall be Twenty Five percent (25%)”.

13.4 Provisional Sums

The following paragraph is inserted as the penultimate paragraph:
“The Provisional Sum shall be used to cover the Employer’s share of the DAAB members’ fees and expenses, in accordance with Clause 21. No prior instruction of the Engineer shall be required with respect to the work of the DAAB. The Contractor shall submit the DAAB members’ invoices and the satisfactory evidence of having paid 100% of such invoices as part of the substantiation of those Statements submitted under Sub-Clause 14.3.

13.6 Adjustments for Changes in Laws

The following paragraphsare added at the end of the Sub-Clause:
“Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [Adjustments for Changes in Cost].”

14.1 The Contract Price

The following is added at the end of the Sub-Clause:
“Notwithstanding the provisions of subparagraph (b), Contractor's Equipment, including essential spare parts, imported by the Contractor for the sole purpose of executing the Contract shall be temporarily exempt from the payment of import duties and taxes upon initial importation, provided the Contractor shall post with the customs authorities at the port of entry an approved re-export bond or bank guarantee, valid until the Time for Completion plus six months, in an amount equal to the full import duties and taxes which would be payable on the assessed imported value of such Contractor's Equipment and spare parts, and callable in the event the Contractor's Equipment is not re-exported from the Country on completion of the Contract. A copy of the bond or bank guarantee endorsed by the customs authorities shall be provided by the Contractor to the

Employer upon the importation of individual items of Contractor's Equipment and spare parts. Upon re-export of individual items of Contractor's Equipment or spare parts, or upon the completion of the Contract, the Contractor shall prepare, for approval by the customs authorities, an assessment of the residual value of the Contractor's Equipment and spare part to be re-exported, based on the depreciation scale(s) and other criteria used by the customs authorities for such purposes under the provisions of the applicable Laws. Import duties and taxes shall be due and payable to the customs authorities by the Contractor on (a) the difference between the initial imported value and the residual value of the Contractor's Equipment and spare parts to re-exported; and (b) on the initial imported value of the Contractor's Equipment and spare parts remaining in the Country after completion of the Contract. Upon payment of such dues within 28 days of being invoiced, the bond or bank guarantee shall be reduced or released accordingly; otherwise the security shall be called in the full amount remaining."
[The Employer may change or delete this Sub-Clause as per Project requirements]

14.2 Advance Payment

14.2.1 Advance Payment Guarantee
The entity issuing the Advance PaymentGuaranteeand its form shall be as under:
The Advance PaymentGuarantee shall be in the form of Guarantee issued by (a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistanor (c)an Insurance Companylisted in the Contract Data and rated by PACRA/VIS ofrating as provided in Table below:
Accepted Contract Amount (In Eq. million PKR) Minimum Rating of Insurance Companies
Up to 1000 A (+)
1001 to no limit AA
In case of Joint Venture, the Advance PaymentGuarantee(s)shall be in the name of the Joint Venture or in the name of Lead/either firm of the JV or in ratio of shares of the individual JV partners.

14.6 Issue of IPC

14.6.1 The IPC
In the first line of the 1st paragraph the words "28 days" are substituted by "14 days".

14.7 Payment

The words "or through crossed cheque in favour of the Contractor or JV partners. The Payment to JV partners shall be made at the request of the Joint Ventures in the ratio of their shares specified by them" are added at the end of the Sub-Clause.

14.8 Delayed Payment

In the first paragraph, third line, the words "compounded monthly" are deleted.
The text of 2nd paragraph is deleted and substituted with the following:
"The Employer shall pay to the Contractor compensation at the rate stated in the Contract Data."

14.9 Release of Retention Money

The following is added at the end of Sub-Clause 14.9:
"Unless otherwise stated in the Contract, when the Taking-Over Certificate has been issued for the Works and the first half of the Retention Money has been certified for payment by the Engineer, the Contractor shall be entitled to substitute a guarantee, in the form annexed to the Particular Conditions or in another form approved by the Employer and issued by a schedule bank selected by the Contractor, for the second half of the Retention Money. The Contractor shall ensure that the guarantee is in the amounts and currencies of the second half of the Retention Money and is valid and enforceable until the Contractor has executed and completed the Works and remedied any defects, as specified for the Performance Security. On receipt by the Employer of the required guarantee, the Engineer shall certify, and the Employer shall pay the second half of

the Retention Money. The release of the second half of the Retention Money against a guarantee shall then be in lieu of the release after the latest of the expiry dates of the Defects Notification Periods. The Employer shall return the guarantee to the Contractor within 21 days after receiving a copy of the Performance Certificate.

If the Performance Security required under Sub-Clause 4.2 is in the form of a demand guarantee, and the amount guaranteed under them when the Taking-Over Certificate is issued is more than half of the Retention Money, then the Retention Money guarantee will not be required. If the amount guaranteed under the Performance Security when the Taking-Over Certificate is issued is less than half of the Retention Money, the Retention Money guarantee will only be required for the difference between half of the Retention Money and the amount guaranteed under the Performance Security.

15.2 Termination for Contractor's Default

15.2.1 Notice
Following text is added at the end of sub-paragraph (h) of this Sub-Clause:
"For the purposes of this Contract, corrupt and fraudulent practices have been defined in Public Procurement Rules 2004."
15.2.3 After Termination
The word "and" at the end of sub-paragraph (ii) of paragraph (b) is deleted the following paragraph is added after sub-paragraph (iii):
"(iv) all Employer-Supplied Materials and/or Employer's Equipment madeavailable to the Contractor in accordance with Sub-Clause 2.6 [Employer-Supplied Materials and Employer's Equipment], and"

15.4 Payment after Termination

The following text is added at the end of this Sub-Clause:
"The Employer shall be entitled to sell any of the Contractor's Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors.

16.2 Termination by Contractor

16.2.1 Notice
The sub-paragraph (j) is deleted in its entirety.
At the end of sub-paragraph (i) "; or" is replaced with "." and at the end of sub-paragraph (h) ";" is replaced with "; or".
In sub-paragraph (f) "84 days" are replaced with "180 days" and text "for reasons not attributable to the Contractor" is added at the end.

16.3 Contractor's Obligations After Termination

Sub-paragraph (c) is deleted and replaced with:
"(c) deliver to the Engineer all Employer-Supplied Materials and/orEmployer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 [Employer-Supplied Materials and Employer's Equipment]; and
(d) remove all other Goods from the Site, except as necessary for safety,and leave the Site."

17.1 Responsibility for Care of the Works

After the two instances of "Goods" in the last paragraph, the words "Employer-Supplied Materials and/orEmployer's Equipment" are added.
The following Sub-Clause 17.7 is added after Sub-Clause 17.6:

17.7 Use of Employer's Accommodation/Facilities

The Contractor shall take full responsibility for the care of the items of the Employer's facilities and/or accommodation, if any, as detailed in the Specification, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer.
If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor's risk and cost.

18.1 Exceptional Events

The words "or disorder" are replaced with "disorder or sabotage" in sub-paragraph (c) of the Clause.

18.4 Consequences of an Exceptional Event

The following is added at the end of sub-paragraph (b) after deleting the ".":
", including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Exceptional Events, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 19.2 [Insurance to be provided by the Contractor]."

18.5 Optional Termination

In sub-paragraph (c), the words "and necessarily" areadded after the words "was reasonably".

19.1 General Requirements

Following text is added at the end of first paragraph:
"The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer's consent."
Following text is added at the end of third paragraph:
"The Contractor shall, within the respective periods stated in the Contract Data submit to the Engineer and the Employer a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5."

19.2 Insurance to be provided by the Contractor

19.2.5 Injury to employees
The words "sickness, disease" are deleted in the third line of first paragraph.

The following Sub-Clause is added after Sub-Clause 19.2.6:
19.2.7 Insurance Company
"The Contractor shall be obliged to place all insurances described in this Clause with insurers listed in the Contract Data and rated byPACRA/VISofrating as provided in Table below:

Accepted Contract Amount (In Eq. million PKR)	Minimum Rating of Insurance Companies
Up to 1000	A (+)
1001 to no limit	AA

21.6 Arbitration

The word "international" is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following:
"the Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;"
The following Clauses are added after Clause 21

22 Custom Duty

[Employer may incorporate provisions where applicable. However, in order to make the bid more balanced, the payment of Customs Duties should be the responsibility of the Employer.]

23 Taxes

The Contractor, Subcontractors and their employees shall be liable to pay income tax, withholding tax, super tax and other taxes on income arising out of the Contract. The rates and prices as stated in the contract shall be deemed to cover all such taxes.

24 Integrity Part

If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall be entitled to :

(a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by the Contractor or any of his Subcontractors, agent or servants;

(b) terminate the Contract; and

(c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agent or servants.

The termination under sub-paragraph(b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1 to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub-paragraph(a) and (c) of this Sub-Clause.

Appendix General Conditions of Dispute Avoidance/Adjudication Agreement

12 Disputes Under DAAB Agreement

In the first paragraph, third, fourth and fifth line, the text "under the Rules of Arbitration of the International Chamber of Commerce 2017……shall apply" is substituted with "under the Arbitration Act 1940 by sole arbitrator appointed by the Managing Director Public Procurement Regulatory Authority or Chairman Pakistan Engineering Council."

Bid Securing Declaration

FORM OF BID SECURING DECLARATION

Date:
No.:
Alternative No.: ***P114094***

To: **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority), Executive Engineer Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province).**

We, the undersigned, declare that:

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

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

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

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

Name of the Bidder*
Name of the person duly authorized to sign the Bid on behalf of the Bidder** _____
Title of the person signing the Bid _____
Signature of the person named above _____
Date signed _____ day of _____, _____
*: In the case of the Bid submitted by joint venture specify the name of the Joint Venture as Bidder
**: Person signing the Bid shall have the power of attorney given by the Bidder attached to the Bid

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

Contract Form

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of _____ (month) 20_____ between **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority), Executive Engineer Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province).** (hereinafter called the "Employer") of the one part and _____ (hereinafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz., **ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES (*P114094*)** should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnessed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.
2. The following documents, in the order of priority, after incorporating addenda, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement:

a) This Contract Agreement;
b) The Letter of Acceptance;
c) The Letter of Bid;
d) The Particular Conditions Part A - Contract Data;
e) The Particular Conditions Part B - SpecialProvisions;
f) The General Conditions;
g) The Specifications Part A - SpecificProvisions;
h) The Specifications Part B- Technical Provisions;
i) The Drawings;
j) The Completed Schedules to Bid including Schedule of Prices;
k) the JV Undertaking (if the Contractor is a JV); and
l) [Employer to insert any other documents forming part of the Contract]

The addenda/corrigenda,if any, (Excluding part relating to Instructions to Bidders alongwith Bidding Data) shall be deemed to have been incorporated at the appropriate places in the "Documents forming the Contract".

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.
4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of the Contactor Signature of Employer

(Seal) (Seal)

Signed, Sealed and Delivered in the presence of:

Witness Witness

(Name, Title and Address) (Name, Title and Address)

DAAB Agreement

[All italicised text and any text within square brackets (except sub-clause headings) in this form of agreement is for use in preparing the form and should be deleted from the final product].

Name and details of the Contract ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

_____

This Agreement made the _____day of _____ [month], _____ [year], between

Name and contact details of the Employer **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority), Executive Engineer**
Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province).
+92-334-309-3643
nooraee04@gmail.com

Name and contact details of the Contractor _____ (name)
_____ (address)
_____ (telephone)
_____(email / other contact details);

Name and contact details of the DAAB Member _____ (name)
_____ (address)
_____ (telephone)
_____(email / other contact details);

("DAAB Agreement")

Whereas:
A. the Employer and the Contractor have entered (or intend to enter) into the Contract;
B. under the Contract, the "DAAB" or "Dispute Avoidance/Adjudication Board" means the sole member or three members (as stated in the Contract Data of the Contract) so named in the Contract, or appointed under Sub-Clause 21.1 [Constitution of the DAAB] or Sub-Clause 21.2 [Failure to Appoint DAAB Members] of the Conditions of Contract;
C. the Employer and the Contractor desire jointly to appoint the above-named DAAB Member to act on the DAAB as:
a. the sole member of the DAAB, and where this is the case, all references to the "Other Members" do not apply; or
b. one of three members / chairman [delete the one which is not applicable] of the DAAB and, where this is the case, the other two persons are:

_____ (name) _____ (name)
_____ (address) _____ (address)
_____(telephone) _____(telephone)

_____(email/ other contact details) _____ (email/other contact details)

the "**Other Members**"; and
D. the DAAB Member accepts this appointment.

The Employer, Contractor and DAAB Member jointly agree as follows:

1. The conditions of this DAAB Agreement comprise:
(a) Clause 21 [Disputes and Arbitration] of the Conditions of Contract, and any other provisions of the Contract that are applicable to the DAAB's Activities; and
(b) the "General Conditions of Dispute Avoidance/Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for Construction" Second Edition 2017 published by FIDIC ("GCs"), as amended and/or added to by the following provisions.
2. [Details of amendments to the GCs, if any. For example:
In the procedural rules annexed to the GCs, Rule _ is deleted and replaced by: " … "]
3. The DAAB Member shall be paid in accordance with Clause 9 of the GCs. The currency of payment shall be _____.
In respect of Sub-Clauses 9.1 and 9.2 of the GCs, the amounts of the DAAB Member's monthly fee and daily fee shall be:
monthly fee_____ per month, and
daily fee of_____ per day
(or as otherwise set under Sub-Clause 9.3 of the GCs).
4. In consideration of the above fees, and other payments to be made to the DAAB Member in accordance with the GCs, the DAAB Member undertakes to act as DAAB Member in accordance with the terms of this DAAB Agreement.
5. The Employer and the Contractor shall be jointly and severally liable for the DAAB Member's fees and other payments to be made to the DAAB Member in accordance with the GCs.
6. This DAAB Agreement shall be governed by the law of _____ (if not stated, the law that governs the Contract under Sub-Clause 1.4 of the Conditions of Contract).

SIGNED by:_____	SIGNED by:_____	SIGNED by:_____
Print name:_____	Print name:_____	DAAB Member
Title: _____	Title:_____	Title:_____
for and on behalf of the Employer	for and on behalf of the Contractor	
in the presence of	in the presence of	in the presence of
Witness:_____	Witness:_____	Witness:_____
Name:_____	Name:_____	Name:_____
Address:_____	Address:_____	Address:_____
_____	_____	_____
Date:_____	Date:_____	Date:_____

FORM OF MOBILIZATION ADVANCE GUARANTEE/ BOND

Guarantee No._____ Date _____

WHEREAS _____ (hereinafter called the 'Employer')
has entered into a Contract for _____
(Particulars of Contract)
with _____ (hereinafter called the "Contractor').
AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Pak Rupees _____ (PKR _____) which amount shall be advanced to the Contractor as per provisions of the Contract.
AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.
AND WHEREAS, _____

(hereinafter called the “Guarantor”) at the request of the Contractor and in consideration of theEmployer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.
NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.
Notice in writing of any default,on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.
This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____whichever is earlier.
(Date)
The Guarantor's liability under this Guarantee shall not in any case exceed the sum of
PKR _____ (PakRupees _____).
This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against paymentsfrom Interim Payment Certificates of the Contractor provided that the Guarantor

agrees that the aforesaid period of validity shall be deemed to be extended if on the above mentioned date the advance payment is not fully adjusted.

Guarantor
(Scheduled Bank/ Insurance Company)

Signature _____
Name _____
Title _____

WITNESS:

1. _____
_____
Corporate Secretary (Seal) Corporate Guarantor (Seal)

2. _____
_____
Name, Title & Address

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

Retention Money Security
Demand Guarantee

_____ [Guarantor letterhead or SWIFT identifier code]
Beneficiary: _____ [Insert name and Address of 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 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 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 orifthe 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 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 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

Integrity Pact

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

Contract Number: Contract Value: Contract Title:

Dated:

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

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

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

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

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

Name of Employer: ……
Signature: ……
[Seal]

Name of Bidder/Contractor: ……
Signature: …….
[Seal]

Performance Guarantee Form

FORM OF PERFORMANCE SECURITY

Guarantee No._____
Executed on _____
Expiry date _____

Name of Guarantor with address: _____

Name of Principal (Contractor) with address:_____

Penal Sum of Security (express in words and figures) _____

Letter of Acceptance No. _____Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the **Korangi Fisheries Harbour Authority (Korangi Fisheries Harbour Authority), Executive Engineer Chashma Goth, Rehri., Bin Qasim Sub-Division, Malir (District), Karachi (Division), Sindh (Province).** (hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for _____ _____

(Name of Contract) for the **ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES** (**P114094**)
_____ (Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause11, Defects After Taking Over, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We, _____ (the Guarantor), waiving all objections and defense under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the

Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall decide, whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

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

Guarantor
(Schedule Bank/ Insurance Company)
Signature: _____
Name: _____
Title: _____

Corporate Guarantor (Seal)

WITNESS:

1.
_____
_____

2.

_____
_____
Name, Title & Address

Annexure

Annexure-I

Annexure-I pertains to Volume-I of the Bidding Documents, comprising the Qualification Document. The complete document shall be read thoroughly and carefully before filling in and submitting the Bidding Documents. The same shall be considered an integral part of the Contract.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-I** (page number: 120)

Annexure-II

Annexure-II pertains to Volume-II of the Bidding Documents, comprising the Instructions to Bidders, Bidding Data, Letter of Technical Bid, Schedules to Bid, Standard Forms, and Conditions of Contract. The complete document shall be read thoroughly and carefully before filling in and submitting the Bidding Documents and shall be considered an integral part of the Contract. All required forms and documents specified therein shall be duly completed and uploaded along with the Bidding Documents.

Technical Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Annexure-II** (page number: 149)

Annexure-III

Annexure-III pertains to Volume-III of the Bidding Documents, comprising Specifications – Civil Works. The complete document shall be read thoroughly and carefully before filling in and submitting the Bidding Documents and shall be considered an integral part of the Contract.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-III** (page number: 254)

Annexure-IV

Annexure-IV pertains to Volume-IV of the Bidding Documents, comprising Bidding Drawings. The complete document shall be read thoroughly and carefully before filling in and submitting the Bidding Documents and shall be considered an integral part of the Contract.

Financial Submission (Vendor)

Document Required

See Form Under Additional Forms and Documents: **Annexure-IV** (page number: 366)

Annexure-V

Annexure-V pertains to Volume-V of the Bidding Documents, comprising the Letter of Financial Bid, Schedule-B to Bid: Bill of Quantities, and Schedule-H to Bid: Estimated Progress Payments. The complete document shall be read thoroughly and carefully before filling in and submitting the Bidding Documents and shall be considered an integral part of the Contract. All required forms and documents specified therein shall be duly completed and uploaded along with the Bidding Documents.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-V** (page number: 377)

Annexure-VI

Annexure-VI pertains to the Testing Report, comprising the details and results of the tests conducted in respect of the Works. The complete document shall be read thoroughly and carefully before filling in and submitting the Bidding Documents. The same shall be considered an integral part of the Contract.

Information (Read-Only)

See Form Under Additional Forms and Documents: **Annexure-VI** (page number: 432)

Adjustment Data

Refer to Schedule A to bid of Volume-II attached as Annexure-II.

SBD Document (Read-Only)

See Form Under Additional Forms and Documents: **Adjustment Data** (page number: 566)

Procurement Forms

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

PUBLIC PROCUREMENT REGULATORY AUTHORITY
(PPRA)
EPADS

Additional Forms and Documents

KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DOCUMENTS

VOLUME-I

QUALIFICATION DOCUMENT

July, 2026

National Engineering Services Pakistan (Pvt.) Ltd.
13th Floor, N.I.C. Building, Abbasi Shaheed Road, Off. Shahrah-e-Faisal, Karachi
Phone: (0092 21) 99207277-84
Fax: (0092 21) 35651994
E-mail: nespakkh@khi.wol.net.pk
Web: http://www.nespak.com.pk

Clearance Code	4344/50W/BD/5(26)	Doc No.	4344/BD/PII/00	Rev No.	00

National Engineering Services Pakistan (Pvt.) Ltd. NESPAK Karachi

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DOCUMENTS
VOLUME-I

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QUALIFICATION DOCUMENT

1. INTRODUCTION

Korangi Fisheries Harbour Authority (KoFHA) (hereinafter called the "Employer") is undertaking the Works "Package-II: Establishment & Upgradation of Jetty and Related Structures". For this purpose, Bids are invited from interested national construction firms as per Single Stage Two - Envelopes bidding procedure as stated in Pakistan Public Procurement Rules-36 (b).

2. SCOPE OF WORKS

Project envisages the establishment and upgradation of the jetty and all associated marine and landside structures, including civil, structural, and ancillary works necessary for full operational functionality. The Works include site preparation, construction, rehabilitation, installation of required fixtures, and integration with existing infrastructure. The Contractor shall ensure compliance with all technical specifications, safety standards, and regulatory requirements. All works shall be executed using approved methodologies, qualified personnel, and suitable equipment to achieve the intended performance and durability.

3. INSTRUCTIONS TO BIDDERS

3.1 SUBMISSION OF BIDDERS' DOCUMENTS

3.1.1 Documents for qualification must be submitted electronically through PPRA E-PADS Version 2.0. No hard copy of the bid will be entertained with the Technical Bid.

3.1.2 Documents shall be prepared in the English language. Information in any other language shall be accompanied by its translation in English.

3.1.3 Authorized person of the bidders shall sign and stamp all pages of the documents for qualification.

3.1.4 The bidders must respond to all questions and provide complete information as advised in this document. Any false information provided or any lapses to provide essential information may result in disqualification of the bidder.

3.1.5 The bidders understand that the scope of Works described is as under Para 2 above.

3.1.6 The bidder's queries, if any, may be sent to the Employer in writing at the following address:

1) Name: Engr. Noor Ahmed Rind
   Designation: Executive Engineer
   Number: 0334-3090643
   Email: engineeringdepartmentkofha@gmail.com

2) Name: Engr. Ghulam Nabi
   Designation: Supervisor Works (KoFHA)
   Number: 0328-2669083
   Email: engrghulamnabihere@gmail.com

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3.1.7 The bidders shall bear all costs associated with the preparation and submission of their documents for qualification and any other costs incurred in this regard.

3.1.8 Employer reserves the rights for rejection of qualification request in case of non-compliance of the above requirements.

3.2 QUALIFICATION CRITERIA

3.2.1 GENERAL

Qualification will be based on all the criteria given in succeeding Paras 3.2.2, 3.2.3 and 3.2.4 regarding the bidder's capabilities in financial, experience, personnel and equipment, as demonstrated by the bidder's responses in the forms provided.

The Employer reserves the right to waive minor deviations if these don't materially affect the capability of a bidder to perform the contract.

Sub-contractor's experience and resources shall not be taken into account in determining the bidder's compliance with the qualifying criteria. However, for Joint Venture (JV), collective experience, resources and financial soundness of all partners shall be considered for the criteria given in Para 3.3.

The Employer reserves the right to verify or seek clarification of the information furnished by the bidders. The Employer may reject any bid for any misrepresentation made by any bidder in, or pursuant to, their bid or for any statement furnished in connection therewith, and intended to be relied upon by the Employer, which is incorrect in any respect.

Eligibility and Qualification information described here below must be met by the legal entity(ies) comprising the bidder, and not the bidder's/JV partner's sister or parent companies, subsidiaries or affiliates.

3.2.2 MANDATORY REQUIREMENTS

All the bidders shall meet the following mandatory requirements:

a) Bidders applying individually shall have valid registration with Pakistan Engineering Council in Category C-3 or above and at least in Specialization Codes CE03 & CE10. In case of a Joint Venture, each partner shall have valid registration with Pakistan Engineering Council in Category C-3 or above and the JV partners collectively shall have at least in Specialization Codes CE03 & CE10.

b) Provision of valid NTN certificate from Federal Board of Revenue to confirm status of being an active tax-payer.

c) Provision of valid sales tax certificate from Sindh Revenue Board to confirm status of being an active tax-payer.

d) Provision of following affidavits (on non-judicial stamp paper):

   i) An affidavit to the effect that the bidder has never been black-listed by any previous employer.

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ii) An affidavit to the effect that all documents / particulars / information given with these documents are true.

iii) An affidavit to the effect that the bidder has never indulged in corrupt, fraudulent or collusive practice for procuring contracts.

iv) An affidavit to the effect that the bidder is not presently involved nor has been in the past in litigation with its employers. Should this be otherwise the bidder must provide such details in Form A-8 "Litigation or Arbitration/Disputes History".

v) An affidavit to the effect that the bidder is not on the list of debarred/ blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and not having been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.

e) Provision of Declaration of Beneficial Ownership Information duly completed and signed in the prescribed proforma (**Form A-1(b)**).

f) Provision of verifiable audited balance sheets of last three (03) years.

g) Provision of at least one (1) similar nature work, i.e. repair, rehabilitation, or construction of a reinforced concrete jetty or other marine structure, such as jetties and wharves, quay walls, piers and berths, dolphins (mooring/breasting), breakwaters and seawalls, revetments, or groynes, completed within the last ten (10) years, with a contract value of Rs. 300 million or above.

h) All above requirements shall be fulfilled by every firm individually in a Joint Venture (JV), except Sub-Para 3.2.2(a) and 3.2.2(g) to qualify for further detailed evaluation.

i) All the Bidders must be registered on the E-Pak Acquisition and Disposal System (E-PADS Version 2.0)

j) In case of Joint Venture (JV), the JV partners must be registered jointly on E-PADS Version 2.0 as JV partners. In case of non-compliance, the bid shall be rejected.

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

3.2.3 DETAILED EVALUATION

After the initial screening of all the bidder's documents, a detailed evaluation shall be undertaken using the following criteria based on the scoring system as follows:

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Category	Marks	
	Maximum	Minimum Acceptable
Financial Capability	30	15
Experience Capability	40	20
Personnel Capability	20	10
Equipment Capability	10	05

To qualify, bidders must receive not less than the specified minimum acceptable **50 percent** marks for each category and aggregate of minimum **65** marks.

The bidder is to provide substantial documentary evidence in each case for marking in the Qualification Criteria. Where it is found that substantial evidence is not available, the marking will not be made.

3.2.4 CRITERIA FOR DETAILED EVALUATION

Detailed evaluation criteria are as below: -

3.2.4.1 Financial Capability

Financial Soundness of a bidder will be considered as follows:

i) The bidder should demonstrate that he has access to, or has available liquid assets, un-encumbered real assets, lines of credit and other financial means sufficient to meet the cash flow for the execution of Works.

ii) The Audited Balance Sheet of last three (03) years **(Form A-2 and A-3)** from Chartered Accountant firm must be submitted and should demonstrate the soundness of the bidder's financial position, showing long term profitability. Where necessary, the Employer may make inquiries with the bidder's bankers, financial institutes and auditors.

iii) Marks shall be awarded under this category based on the following criteria:

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Sr. No.	Description	Maximum Marks Assigned	Criteria for Marks Obtained
a)	Available Bank Credit Line (latest)	03	• One (01) mark will be given if the available bank credit line limit is equal to Pak Rs 150 million. • One (01) additional mark will be given for every Pak Rs 100 million increase in the Credit Line. • Full marks will be given in case of credit line limit ≥ Pak Rs 350 million.
b)	Average Working Capital (from Audited Balance Sheets of last three (03) years)	12	• Six (06) marks will be given if the average working capital for last three years is equal to Pak Rs 100 million. • One (01) additional mark will be given for every Pak Rs 50 million increase in the working capital. • Full marks will be given in case of average working capital ≥ Pak Rs 400 million.
c)	Average Annual Turnover (from Audited Balance Sheets of last three (03) years)	12	• Six (06) marks will be given if the average annual turnover for last three years is equal to Pak Rs 150 million. • One (01) additional mark will be given for every Pak Rs. 50 million increase in the average annual turnover. • Full marks will be given in case of Average Annual Turnover ≥ Pak Rs 450 million.
d)	Income tax returns for the last 03 years	03	• Full marks will be given in case of income tax returns for the last three years are submitted. • No marks will be given if income tax returns for the last three years are not submitted.
Total Marks Allocated		**30**	

3.2.4.2 Experience Capability

Experience for general civil works and similar/ comparable projects completed **(Form A-4)** will be evaluated on the basis of the following marking criteria. The similarity of the projects shall be determined based on the repair, rehabilitation, or construction of a reinforced concrete jetty or other marine structure, such as jetties and wharves, quay walls, piers and berths, dolphins (mooring/breasting), breakwaters and seawalls, revetments, or groynes.

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S. No.	Experience Capability	Maximum Marks Assigned
1.	**General Civil Works:** General civil works carried out/ completed in last ten (10) years amounting to Rs 200 million or above. 1 Project: 5 Marks, More than 1 Project: 10 Marks	10
2.	**Similar Nature Works:** Similar nature of works/ projects carried out/ completed in last ten (10) years amounting to Rs 300 million or above, 1 Similar project: 10 Marks, 2 Similar projects: 20 Marks, More than 2 Similar projects: 30 Marks	30
	Total Marks Allocated	**40**

Information regarding experience/ projects should be supported by documentary evidence such as Letter of Award and Taking-Over Certificate/ Defects Liability Certificate and any other relevant document. No marks will be given if supporting documents are not submitted.

3.2.4.3 Personnel Capability

Personnel Capability **(Form A-5 & A-6)** will be evaluated on the basis of following marks:

Sr. No.	Personnel	Marks (Maximum)
i.	Project Manager (Civil)	6
ii.	Planning & Scheduling Engineer (Civil)	5
iii.	Site Engineer (Civil)	3
iv.	Site Supervisor (Civil)	2
v.	Quantity Surveyor	2
vi.	Surveyor	2
	Total Marks Allocated	**20**

Information regarding educational qualification, total work experience and specific work experience should be supported by documentary evidence such as copy of education qualification certificate/ degree, PEC/ relevant institution Certificate, CVs and employment status with the bidder of concerned personnel(s) proposed for the below positions duly signed by the personnel(s) itself or authorized person of the firm. No marks will be given if supporting documents are not submitted.

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

i) Project Manager (Civil)
(Must be at least Bachelor's Degree holder in Civil Engineering)

Work Experience (years)	Marks
General Experience	
More than 15	2
10^{+}-15	1
10 or less	0
Specific Experience in Marine Structures Works	
More than 10	4
05^{+}-10	2
05 or less	0
Total Marks (Maximum)	**6**

ii) Planning & Scheduling Engineer (Civil)
(Must be at least Bachelor's Degree holder in Civil Engineering and proficiency in Primavera, P6 Version)

Work Experience (years)	Marks
Specific Experience	
More than 10	5
05^{+}-10	3
05 or less	0
Total Marks (Maximum)	**5**

iii) Site Engineer (Civil)
(Must be at least Bachelor's Degree holder in Civil Engineering)

Work Experience (years)	Marks
Specific Experience in Marine Structures Works	
More than 10	3
05^{+}-10	2
05 or less	0
Total Marks (Maximum)	**3**

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

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iv) Site Supervisor (Civil)
(Must be at least Diploma of Associate Engineer in Civil)

Work Experience (years)	Marks
Specific Experience in Marine Structures Works	
More than 10	2
05^{+}-10	1
05 or less	0
Total Marks (Maximum)	**2**

v) Quantity Surveyor
(Must be at least Diploma of Associate Engineer in Civil)

Work Experience (years)	Marks
More than10	2
05^{+}-10	1
05 or less	0
Total Marks (Maximum)	**2**

vi) Surveyor
(Must be at least Diploma of Associate Engineer in Civil/ Certificate holder in Surveying)

Work Experience (years)	Marks
Specific Experience in Marine Structures Works	
More than10	2
05^{+}-10	1
05 or less	0
Total Marks (Maximum)	**2**

3.2.4.4 Equipment Capability

The bidder should own, or have assured access to (through rental, lease, purchase agreement or other means), the following key equipment (limited to only major items of equipment) in full working order, and must demonstrate that, based on known commitments, these will be available for deployment on the proposed contract or works **(Form A-7)**. The bidder may also list alternative equipment which he would propose for the contract together with an explanation and documentary evidence of the alternate proposal.

Marks will be given on the basis of the following criteria:

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Equipment Type & Characteristics	Unit	Minimum Requirement	Marks	
			Owned	Leased / Rental
1. Floating Barge	No.	01	3	2
2. Crane with 25 to 30 tons Capacity.	No.	01	1	1
3. Boat	No.	01	1	1
4. Concrete Mixer Machine	No.	01	1	1
5. Scaffolding	No.	1000 Sq-ft	2	1
6. Compressor 180 CFM or Above	No.	01	2	1
Total Marks Allocated			**10**	**7**

3.3 LITIGATION OR ARBITRATION/ DISPUTES HISTORY

The bidder shall provide accurate information of all litigation or arbitration/ disputes resulting from contracts completed or under execution over the last ten (10) years **(Form A-8)**. A consistent history of award against the bidder may result in rejection of the bid.

3.4 JOINT VENTURE (JV)

Joint Venture shall comply with the following requirements:

3.4.1 Following are minimum qualification requirements: -

i) The lead partner shall meet not less than **forty percent (40%)** of all qualifying criteria given in Paras 3.2.3 and 3.2.4 heretofore.

ii) Each of the partners shall meet not less than **twenty five percent (25%)** of all the qualifying criteria given in Paras 3.2.3 and 3.2.4 heretofore.

iii) The Joint Venture shall collectively satisfy the criteria of Paras 3.2.3, 3.2.4 and 3.4, for which purpose the relevant figures for each of the partners shall be added together to arrive at the JV's total capacity.

3.4.2 One of the Joint Venture partners shall be nominated as being in charge/ lead partner; and this authorization shall be evidenced by submitting a power of attorney signed by legally authorized signatories of all the Joint Venture partners. The Joint Venture Agreement shall form the Integral Part of the Contract, if the Bid is accepted by the Employer. The Joint Venture Agreement shall bound all parties to execute the Works as per their participating interests and the Joint Venture Agreement must clearly indicate division of works/ responsibilities between the J.V. partners.

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3.4.3 Application shall be signed by all members in the JV, so as to legally bind all partners, jointly and severally. The application shall be submitted along with a copy of the JV agreement providing the joint and several liabilities with respect to the contract.

3.4.4 The qualification of a Joint Venture (JV) does not necessarily qualify any of its partners individually or as a partner in any other Joint Venture (JV). In case of dissolution of a Joint Venture (JV), each one of the constituent firms may qualify if they meet all the qualification requirements and any partner has requested/shall request for the same and then his qualification shall be subject to the written approval of the Employer.

3.4.5 Constructor(s) / firm(s) in JV shall submit details of distribution of works to be executed by the partners of JV with specific reference to buildings/ facilities, systems, equipment, resources and responsibilities along with JV Agreement.

3.5 CONFLICT OF INTEREST

The bidder must not be associated, nor have been associated in the past, with the consultant or any other entity that has prepared the design, specifications, and other pre-qualification and bidding documents for the project, or was proposed as Engineer for the contract, over the last five years. Any such association may result in disqualification of the bidder.

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ANNEXURE-A

LETTER OF POST-QUALIFICATION

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Annexure-A

Letter of Post-Qualification

[Letterhead paper of the Bidder, including full postal address, telephone no., fax no., telex no., cable and e-mail address]

Date:

To: **Engr. Noor Ahmed Rind**
Executive Engineer / Project Director
Korangi Fisheries Harbour Authority (KoFHA)
Chashma Goth, Rehri, District Malir,
Karachi - Pakistan

Sirs,

1. Being duly authorized to represent and act on behalf of..... (hereinafter "the Bidder"), and having reviewed and fully understood all the qualification information provided, the undersigned hereby apply to be qualified as a bidder for the project, **"Package-II: Establishment & Upgradation of Jetty and Related Structures"**.

2. Attached to this letter are copies of original documents defining[1]:

   (a) the Bidder's legal status;
   (b) the principal origin and abode of business; and
   (c) the place of incorporation (for Bidders who are corporations); or
   (d) the place of registration and the nationality of the owners (for Bidders who are partnerships or individually-owned firms).

3. Your Agency and its authorized representatives are hereby authorized to conduct any inquiry or investigations to verify the statements, documents, and information submitted in connection with this bid, and to seek clarification from our bankers and clients regarding any financial and technical aspects. This Letter of Application will also serve as authorization to any individual or authorized representative of any institution referred to in the supporting information, to provide such information deemed necessary and requested by yourselves or the authorized representative to verify statements and information provided in this bid, or with regard to the resources, experience, and competence of the Bidder.

4. Your Agency and its authorized representatives may contact the following persons for further information[2], if needed.

.

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General and Managerial Inquiries	
Contact 1	Telephone 1
Contact 2	Telephone 2
Email 1	Email 2

Personnel Inquiries	
Contact 1	Telephone 1
Contact 2	Telephone 2
Email 1	Email 2

Technical Inquiries	
Contact 1	Telephone 1
Contact 2	Telephone 2
Email 1	Email 2

Financial Inquiries	
Contact 1	Telephone 1
Contact 2	Telephone 2
Email 1	Email 2

5. This application is made with the full understanding that:

(a) bids by qualified Bidders will be subjected to verification of all information submitted for qualification at the time of bidding;

(b) Your Agency reserves the right to:

(i) amend the scope and value of any contract under this project; in such event bids will only be called from qualified Bidders who meet the revised requirements; and

(ii) reject or accept any bid, cancel the qualification process, and reject bids; and

(c) Your Agency shall not be liable for any such actions and its consequences and under no obligation to inform the Bidder of the grounds for actions at 5(b) here above.

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Bidders who are not Joint Venture (JV) should delete para 6 & 7 and initial the deletions.

6. Appended to this application, we give details of the participation of each party, including capital contribution and profit/loss agreements, to the Joint Venture (JV). We also specify the financial commitment in terms of the percentage of the value of the (each) contract, and the responsibilities for execution of the (each) contract.

7. We confirm that in the event that we bid, that bid as well as any resulting contract will be.

(a) Signed so as to legally bind all partners, jointly and severally; and
(b) Submitted with a Joint Venture (JV) agreement providing the joint and several liability of all partners in the event the contract is awarded to us.

8. We certify that the information provided in application is correct and final to the best of our knowledge and nothing contained herein, is contrary to the facts as available with the firm's official record and that the Employer has complete right to disregard our bid should it fail to meet any of their qualification criteria.

9. The undersigned declare that the statements made and the information provided in the duly completed application are complete, true, and correct in every detail.

Signed	Signed
Name	Name
For and on behalf of (name of Bidder or lead partner of a Joint Venture)	For and on behalf of (name and signature of other partners of the Joint Venture)

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FORMS

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Form A-1(a) **Page___ of ____Pages**

General Information

All individual firms and each partner of a Joint Venture (JV) applying for qualification are requested to complete the information in this form. Nationality information is also to be provided for Bidders who are forming part of the Joint Ventures as required under the PEC Bye-Laws as a Partnership/Joint Venture.

1.	Name of Firm	
2.	Head Office Address	
3.	Telephone	Contact Person: Name: Title:
4.	Fax	Telex/ Email
5.	Place of Incorporation/Registration	Year of incorporation/registration

Where the Bidder proposes to use named subcontractors for critical components of the works or for work contents in excess of 20 percent of the value of the whole works, the following information should also be supplied for the specialist subcontractor(s).

NATIONALITY OF OWNERS		
	NAME	**NATIONALITY**
1.		
2.		
3.		
4.		
5.		

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Form A-1(b) **Page___ of ____Pages**

Beneficial Ownership Disclosure Form

Name of Bidder or Partner of a Joint Venture

[This Beneficial Ownership Disclosure Form is to be completed by the Bidder. In case of joint venture, the Bidder must submit a separate Form for each member. The beneficial ownership information to be submitted in this Form shall be current as of the date of its submission.]

Declaration of Ultimate Beneficial Owners Information for Public Procurement Contracts.

1. Name
2. Father's Name/Spouse's Name
3. CNIC/NICOP/Passport No.
4. Nationality
5. Residential address
6. Email address
7. Date on which shareholding, control or interest acquired in the business.
8. In case of indirect shareholding, control or interest being exercised through intermediary companies, entries or other legal persons or legal arrangements in the chain of ownership or control, following additional particulars to be provided:

1	2	3	4	5	6	7	8	9	10
Name	Legal form (company/ Limited Liability Partnership/ Association of Persons/Single Member Company/partnership Firm/Trust/Any other individual, body corporate (to be specified)	Date of incorporation / registration	Name of registering authority	Business address	Country	Email Address	Percentage of shareholding, control or interest of BO in the legal person or legal arrangement	Percentage of shareholding, control or interest of legal person or legal arrangement in the Company	Identify of natural person who ultimately owns or control the legal person or arrangement

9. Information about the Board of Directors (details shall be provided regarding number of shares in the capital of the company as set opposite respective names).

Continued on next page

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1	2	3	4	5	6	7	8
Name and Surname (in Block Letters)	CNIC No. (in case of foreigner, Passport No.)	Father's/ Husband's Name in full	Current Nationality	Any other Nationality (ies)	Occupation	Residential address in full or the registered/principal office address for a subscriber other than natural person	Number of shares taken by cash subscriber (in figures and words)
			Total numbers of shares taken (in figures and words)				

10. Any other information incidental to or relevant to beneficial Owner(s).

Name and signature
(Person authorized to issue notice on behalf of the company)

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Form A-2 **Page___ of ____Pages**

Financial Capability

Name of Bidder or Partner of a Joint Venture

Bidders, including each partner of a Joint Venture should provide financial information to demonstrate that they meet the requirements stated in the Instructions to Bidders. Each Bidder or partner of a Joint Venture must fill-in this form. If necessary, use separate sheets to provide complete banker information. A copy of the audited balance sheets certified by Charted Accountant should be attached.

Banker	Name of banker	
	Address of banker	
	Telephone	Contact name and title
	Fax	Telex/ Email

Summarize actual assets and liabilities in Pak Rupees (Equivalent at the current rate of exchange at the end of each year) for last three (03) years, based upon known commitments, projected assets and liabilities in Pak Rupees.

Financial information in PKR	**Actual: Last three (03) years**		
	2025	**2024**	**2023**
1. Total assets			
2. Current assets			
3. Total liabilities			
4. Current liabilities			
5. Profits before taxes			
6. Profits after taxes			

Continued on next page

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Specific proposed sources of financing to meet the cash flow of the Project, net of current commitments (Para 3.2.4.1 of this Document).

Source of financing	**Amount (Pak Rupees or equivalent)**
1.	
2.	
3.	
4.	

Attach audited financial statements for last three (03) years (for individual Bidder or each partner of Joint Venture).

Annual Turnover

All individual firms and all partners of a Joint Venture are requested to complete the information in this form. The information supplied should be the annual turnover of the Bidder (or each member of a Joint Venture), in terms of the amounts billed to clients for each year for work completed over last three (03) years.

Use a separate sheet for each partner of a joint venture.

ANNUAL TURNOVER		
YEAR	**TURNOVER (in actual currency)**	**EQUIVALENT PAK RUPEES (in millions)**
1.		
2.		
3.		
4.		
5.		

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Form A-3 **Page___ of ____Pages**

Joint Venture Summary (if applicable)

NAME OF ALL PARTNERS OF A Joint Venture (JV)
1. Lead Partner
2. Partner
3. Partner
4. Partner
5. Partner

Total value of annual construction turnover, in terms of work billed to clients,

ANNUAL TURNOVER DATA (Equivalent in PAK RUPEES, Millions)				
Partner	**Form A-2 Page No.**	**2025**	**2024**	**2023**
1. Lead Partner				
2. Partner				
3. Partner				
4. Partner				
5. Partner				
Total:				

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Form A-4 **Page___ of ____Pages**

(1) Experience of General Civil Works Completed During Last Ten (10) Years

Name of Bidder or partner of a Joint Venture

Bidders should provide information regarding general civil works/ projects completed. The information shall be supported by documents such as Letter of Award/ Letter of Acceptance and Taking Over/ Completion Certificate, Maintenance/ Defects Liability Certificate and any other relevant document.

Use a separate sheet for each contract.

1.	Name of Contract
	Country
2.	Name of Employer
3.	Employer Address .....
4.	Nature of works and special features relevant to the contract for which the Bidder wishes to qualify ....
5.	Contract Role (Tick One) (a) Main Contractor (b) Sub- Contractor (c) Partner in a Joint Venture/ Consortium
6.	Value of the total contract (in specified currencies) at completion, or at date of award for current contract Contract Price ……. Currency……
7.	Equivalent in Pak Rupees.
8.	Date of Award
9.	Date of Completion
10.	Contract Duration (Years and Months) _____Years _____Months

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Form A-4 **Page___ of ____Pages**

(2) Experience of Similar/ Comparable Projects Completed During Last Ten (10) Years

Name of Bidder or partner of a Joint Venture

Bidders should provide information regarding similar/ comparable projects (comprising of repair, rehabilitation, or construction of a reinforced concrete jetty or other marine structure, such as jetties and wharves, quay walls, piers and berths, dolphins (mooring/breasting), breakwaters and seawalls, revetments, or groynes) completed. The information shall be supported by documents such as Letter of Award/ Letter of Acceptance and Taking Over/ Completion Certificate, Maintenance/ Defects Liability Certificate and any other relevant document.

Use a separate sheet for each contract.

1.	Name of Contract
	Country
2.	Name of Employer
3.	Employer Address .....
4.	Nature of works and special features relevant to the contract for which the Bidder wishes to qualify ....
5.	Contract Role (Tick One) (a) Main Contractor (b) Sub- Contractor (c) Partner in a Joint Venture/ Consortium
6.	Value of the total contract (in specified currencies) at completion, or at date of award for current contract Contract Price ……. Currency……
7.	Equivalent in Pak Rupees.
8.	Date of Award
9.	Date of Completion
10.	Contract Duration (Years and Months) _____Years _____Months

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Form A-5 **Page___ of ____Pages**

Personnel Capability

Name of Bidder or partner of a Joint Venture

For specific positions essential to contract implementation, Bidders should provide the names of candidate qualified to meet the specified requirements stated for each position in Para 3.2.4.3 of this Document. The data on their experience should be supplied on separate sheets using one Form for each candidate (Application Form A-6) along with ***CVs of proposed candidates****.*

S. No.	Title of Position	Name of Personnel
i.	Project Manager (Civil)	
ii.	Planning & Scheduling Engineer (Civil)	
iii.	Site Engineer (Civil)	
iv.	Site Supervisor (Civil)	
v.	Quantity Surveyor	
vi.	Surveyor	

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Form A-6 **Page___ of ____Pages**

Candidate Summary

Name of Bidder or partner of a Joint Venture

Position		**Candidate** [Tick appropriate one] ☐Prime ☐ Alternate
Candidate information	1. Name of Candidate	2. Date of Birth
	3. Professional Qualification	
Present employment	4. Name of employer	
	Address of employer	
	Telephone	Contact (manager/personnel officer)
	Fax	Telex/ Email
	Job title of candidate	Years with present employer

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

Month/ Dates/Years		**Company / Project / Position / Relevant technical and management experience**
From	**To**	

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Form A-7 **Page___ of ____Pages**

Equipment Capability

Name of Bidder or partner of a Joint Venture

The Bidder shall provide adequate information to demonstrate clearly that he has the capability to meet the requirements for each and all items of equipment listed in the Instructions to Bidders. A separate Form shall be prepared for each item of equipment listed in Para 3.2.4.4 of this Document, or for alternative equipment proposed by the Bidder.

Item of Equipment		
Equipment information	1. Name of manufacturer	2. Model and power rating
	3. Capacity	4. Year of manufacture
Current status	5. Current location	
	6. Details of current commitments	
Source	7. Indicate source of the equipment ☐ Owned ☐ Rented ☐ Leased	

Omit the following information if it is owned by the Bidder or partner.

Owner	8. Name of owner	
	9. Address of owner	
	Telephone	Contact name and title
	Fax	Telex/ Email
Agreement	Details of rental/lease specific to the Project.	

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Form A-8 **Page___ of ____Pages**

Litigation or Arbitration/ Disputes History

Name of Bidder or partner of a Joint Venture

Bidders, including each of the partners of a Joint Venture should provide information on any history of litigation or arbitration/ disputes resulting from contracts executed in the last ten years or currently under execution (Para 3.3 of this Document).

Year	Award FOR or AGAINST Bidder	Status of Award in Rule of Law	Name of client, cause of litigation or arbitration and matter in dispute	Disputed amount (Current value in PKR)

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KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DOCUMENTS

VOLUME-II

INSTRUCTIONS TO BIDDERS
BIDDING DATA
LETTER OF TECHNICAL BID
SCHEDULES TO BID
STANDARD FORMS
CONDITIONS OF CONTRACT

July, 2026

National Engineering Services Pakistan (Pvt.) Ltd.
13th Floor, N.I.C. Building, Abbasi Shaheed Road, Off. Shahrah-e-Faisal, Karachi
Phone: (0092 21) 99207277-84
Fax: (0092 21) 35651994
E-mail: nespakkh@khi.wol.net.pk
Web: http://www.nespak.com.pk

Clearance Code	4344/50W/BD/5(26)	Doc No.	4344/BD/PII/00	Rev No.	00

National Engineering Services Pakistan (Pvt.) Ltd. NESPAK Karachi

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DOCUMENTS
VOLUME-II

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INSTRUCTIONS TO BIDDERS (IB)

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INSTRUCTIONS TO BIDDERS
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PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

INSTRUCTIONS TO BIDDERS

A. GENERAL

IB.1 Scope of Bid

1.1 The Employer as defined in the **Bidding Data** hereinafter called the "Employer" wishes to receive bids for the construction and completion of works as described in these Bidding Documents, and summarized in the **Bidding Data** hereinafter referred to as the "Works".

1.2 The successful Bidder will be expected to complete the Works within the time specified in the **Bidding Data**.

IB.2 Source of Funds

2.1 The Employer has applied for/received a funding from the source(s) in various currencies towards the cost of the project specified in the **Bidding Data** and it is intended that part of the proceeds of this funding will be applied to eligible payments under the Contract for which these Bidding Documents are issued.

IB.3 Eligible Bidders

3.1 This Invitation for Bids is open to all Bidders meeting the following requirements at the time of submission of Bids and thereafter:

(a) Duly prequalified for this bidding process;

(b) Duly licensed by the Pakistan Engineering Council (PEC) in the category relevant to the value of the Works in the relevant field of specialization.

However, a Foreign Constructor can submit provisional licence with its Bid but the Foreign Constructor will be required to submit standard licence after award of Contract and before start of work.

Foreign Constructor shall not be eligible to participate in bidding individually. Foreign Constructor shall enter into joint venture with Pakistani Constructor registered with the Pakistan Engineering Council in equivalent/compatible category and submit the joint venture agreement to the Employer before participating in bidding in accordance with PEC Construction and Operation of Engineering Works Bye-laws, 1987;

(c) Pakistani Constructor must be on Active Taxpayer List of the Federal Board of Revenue and provincial revenue authority/ board where applicable; and

(d) All partners constituting the Bidder including proposed subcontractors do not appear in the list of debarred/ blacklisted firms and individuals on the websites of PEC and Federal & Provincial Procurement Regulatory Authorities and have not been declared debarred/ blacklisted by foreign country, international organizations or other foreign institutions.

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IB.4 Eligible Materials, Equipment and Services

4.1 All materials, equipment and services to be supplied under this Contract shall have their origin in eligible countries described under paragraph 4.4 hereunder.

4.2 For purpose of this Clause, "origin" means the place where the Goods are mined, grown or produced or from where the ancillary services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembling of components, a commercially recognized product results that is substantially different in basic characteristics or in purpose or utility from its components.

4.3 The origin of Goods and Services is distinct from the nationality of the Bidder.

4.4 Eligible countries to participate in this bidding process are those which have been notified by Ministry of Interior, Government of Pakistan as Business Friendly Countries (BVL); information can be accessed through following link: http://www.dgip.gov.pk/Files/Visa%20Categories.aspx#L

IB.5 One Bid per Bidder

5.1 Each Bidder shall submit only one Bid either by himself, or as a partner in a joint venture. A Bidder who submits or participates in more than one Bid (other than alternatives pursuant to Clause IB.17) will be disqualified.

IB.6 Site Visit

6.1 The Bidders are advised to visit and examine the Site of Works and its surroundings and obtain for themselves on their own responsibility all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. All cost in this respect shall be at the Bidder's own expense.

6.2 The Bidders and any of their personnel or agents will be granted permission by the Employer to enter upon his premises and lands for the purpose of such inspection, but only upon the express condition that the Bidders, their personnel and agents, will release and indemnify the Employer, his personnel and agents from and against all liability in respect thereof and will be responsible for death or personal injury, loss of or damage to property and any other loss, damage, costs and expenses incurred as a result of such inspection.

B. BIDDING DOCUMENTS

IB.7 Contents of Bidding Documents

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

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1. Instructions to Bidders;
2. Bidding Data;
3. Evaluation Criteria and Qualification Updating Forms;
4. General Conditions (GC);
5. Particular Conditions (PC):
   Part A - Contract Data;
   Part B - Special Provisions;
6. Specifications (SP):
   Part A - Specific Provisions;
   Part B - Technical Provisions;
7. Letter of Bid;
8. Schedules to Bid;
9. Standard Forms:
   (i) Form of Bid Security;
   (ii) Letter of Acceptance;
   (iii) Form of Contract Agreement;
   (iv) Form of Performance Security;
   (v) DAAB Agreement;
   (vi) Form of Mobilization Advance Guarantee;
10. Drawings.

7.2 The Bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of Bid submission will be at the Bidder's own risk. Pursuant to Clause IB.26, bids which are not substantially responsive to the requirements of the Bidding Documents will be rejected.

IB.8 Clarification of Bidding Documents, Pre-Bid Meeting

8.1 Any prospective Bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Employer in writing at the Employer's address indicated in theInvitation for Bids. The Employer will respond to any request for clarification which he receives earlier than the periodspecified in the **Bidding Data**, prior to the deadline for submission of bids.

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

8.3 The Employer may, on his own or at the request of any prospective Bidder(s), hold a pre-bid meeting to clarify issues and to answer any questions on matters related to the Bidding Documents. The date, time and venue of pre-bid meeting, if convened, are as stipulated in the **Bidding Data**. All prospective Bidders or their authorized representatives shall be invited to attend such a pre-bid meeting.

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

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

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

IB.9 Amendment of Bidding Documents

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

9.2 Any addendum thus issued shall be part of the Bidding Documents listed in Sub-Clause IB.7.1 hereof and shall be communicated in writing to all purchasers of the Bidding Documents. Prospective Bidders shall acknowledge receipt of each addendum in writing to the Employer.

9.3 Such addendum shall be issued not later than number of days prior to the deadline for submission of bids, specified in the **Bidding Data**. To afford prospective Bidders reasonable time in which to take an addendum into account in preparing their bids, the Employer may extend the deadline for submission of bids in accordance with Clause IB.20.

C. PREPARATION OF BIDS

IB.10 Cost of Bidding

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

IB.11 Language of Bid

11.1 The Bid and all correspondence and documents related to the Bid exchanged by a Bidder and the Employer shall be in the Bid language stipulated in the **Bidding Data** and Particular Conditions of Contract. Supporting documents and printed literature furnished by the Bidders may be in any other language provided the same are accompanied by duly certified translation of the relevant parts in the Bid language, in which case, for purposes of evaluation of the bid, the translation in Bid language shall prevail.

IB.12 Documents Comprising the Bid

12.1 Each Bidder shall:

(a) submit duly filled in, signed and stamped Letter of Bid and completed Schedules to Bid as required, including priced Bill of Quantities, in accordance with ClauseIB.18 hereof;

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(b) submit Bid Security in accordance with Clause IB.16 hereof;

(c) submit alternative proposal, if permissible in accordance with Clause IB.17;

(d) submit a written power of attorney authorizing the signatory of the Bid to act for and on behalf of the Bidder. The name and position held by each person signing the authorization must be typed or printed below the signature;

(e) submit the Qualification Updating Forms duly filled in, signed and stamped along with requisite attachments, to establish that the Bidder continues to meet the Eligibility and Qualification Criteria set out in the Pre-Qualification Documents and as provided in the Section "Evaluation Criteria and Qualification Updating Forms";

(f) furnish a technical proposal taking into account the various Schedules to Bid, specially the following:

Schedule-C to Bid, Proposed Construction Schedule;

Schedule-D to Bid, Method of Performing the Work;

Schedule-E to Bid, List of Major Equipment;

Schedule-F to Bid, Organization Chart for Supervisory Staff;

and other pertinent information, such as mobilization programme, etc.

12.2 Bids submitted by a joint venture of two (2) or more firms specified in **Bidding Data**, shall comply with the following requirements:

(a) the bid, and in case of a successful bid, the Form of Contract Agreement shall be signed by all members so as to be legally binding on all partners;

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

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

(d) all partners of the joint venture shall at all times and under all circumstances be liable jointly and severally for the execution of the Contract in accordance with the

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Contract terms and a statement to this effect shall be included in the authorization mentioned under Sub-Para(b) above as well as in the Letter of Bid and in the Form of Contract Agreement (in case of a successful bid); and

(e) a copy of the agreement entered into by the joint venture partners shall be submitted with the bid stating the conditions under which it will function, its period of duration, the persons authorized to represent andobligate it and which persons will be directly responsible for due performance of the Contract and can give valid receipts on behalf of the joint venture, the proportionate participation and corresponding duties& responsibilities of the several firms forming the joint venture, and any other information necessary to permita full appraisal of its functioning. No amendments/ modifications whatsoever in the joint venture agreementshall be agreed to between the joint venture partners without prior written consent of the Employer.

12.3 Bidders shall also submit proposals of work methods and schedule, in sufficient detail to demonstrate the adequacy of the Bidders' proposals to meet the technical specifications and the completion time referred to in Sub-Clause IB.1.2 hereof.

IB.13 Bid Prices

13.1 The price and discount if any quoted by the Bidders in the Letter of Bid and in the Bill of Quantity shall conform to the requirement specified below:

13.2 The Bidder shall quote any discounts and the methodology for their application.

13.3 If bids are being invited for individual lots (contracts) or for any combination of lots, the Bidders can offer discounts for the individual lots (contracts) as well as for award of more than one Contract and shall specify in their bid.

13.4 Unless stated otherwise in the Bidding Documents, the Contract shall be for the whole of the Works as described in Sub-Clause IB.1.1 hereof, based on the unit rates and/or prices.

13.5 The Bidders shall fill in rates and prices for all items of the Works described in the Bill of Quantities. Items against which no rate or price is entered by a Bidder will not be paid for by the Employer when executed and shall be deemed covered by rates and prices for other items in the Bill of Quantities.

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

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Additional/reduced duties, taxes and levies due to subsequent additions or changes in legislation shall be reimbursed/ deducted as per Sub Clause 13.6 [*Adjustment for Changes in Laws*] of the Conditions of Contract.

13.7 The rates and prices quoted by the Bidders are subject to adjustment during the performance of the Contract in accordance with the provisions of Sub-Clause 13.7 [*Adjustments for Changes in Cost*] of the General Conditions of Contract. The Bidders shall furnish the prescribed information for the price adjustment formulae in Schedule-A to Bid, and shall submit with their bids such other requisite supporting information if required under the said Schedule.

IB.14 Currencies of Bid and Payment

14.1 The unit rates and the prices shall be quoted by the Bidder entirely PKR.

A Bidder expecting to incur expenditures in other currencies for inputs to the Works supplied from outside the Employer's country (referred to as the "Foreign Currency Requirements") shall indicate in Table III of Schedule-A to Bid the proportion of the Bid Price (excluding Provisional Sums) needed by him for the payment of such Foreign Currency Requirements; in such case the unit rates and the prices shall be quoted by the Bidder in Equivalent PKR.

14.2 The rates of exchange to be used by the Bidder for currency conversion shall be the TT Selling Rates published or authorized by the State Bank of Pakistan prevailing on the date twenty eight (28) days prior to the deadline for submission of bids. Such rates shall be notified by the Employer not later than fourteen (14) days prior to the deadline for submission of Bids.

For the purpose of payments, the exchange rates used in Bid preparation shall apply for the duration of the Contract.

IB.15 Bid Validity

15.1 Bids shall remain valid for the period stipulated in the **Bidding Data** after the date of Bid Opening specified in Clause IB.23.

15.2 In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the Bidders extend the period of validity for a specified additionalperiod which normally may not be more than the original bid validity period. The request and the responses thereto shall be made in writing. A Bidder may refuse the request without forfeiting his Bid Security. A Bidder agreeing to the request will not be required or permitted to modify his bid, but will berequired to extend the validity of his Bid Security for the period of the extension, and in compliance with Clause IB.16 in all respects.

IB.16 Bid Security

16.1 Each Bidder shall furnish, as part of his bid, a Bid Security in original form in the amount stipulated in the **Bidding Data** in PKR or an equivalent amount in a freely convertible currency.

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16.2 The Bid Security shall be, at the option of the Bidder, in the form of Call Deposit Receipt (CDR)/ Pay Order or a Security issued in the prescribed form included in the Bidding Documents, by (a) a Scheduled Bank in Pakistan or (b) a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan or (c) an Insurance Company listed in the **Bidding Data** and rated by PACRA/VIS of rating as provided in Table below in favour of the Employer valid for a period 14 days beyond the Bid Validity date. The Bid Security of Joint Venture shall be in the name of Joint Venture or Lead/either Firm of the JV or in ratio of shares of the individual JV partners, submitting the bid.

Bid Price (In Eq. million PKR)	Minimum Rating of Insurance Companies
Up to 1000	A (+)
1001 to no limit	AA
[Note: Insurance Company includes Joint Ventures of Insurance Companies also]	

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

16.4 The Bid Securities of the Bidders except the lowest three will be returned by the Employer within twenty eight (28) days from the opening of Bids, provided a Bidder requests for the return of its Bid Security, or upon the expiry of original validity of Bid Security or as extended, whichever is earlier.

16.5 The Bid Security of the lowest three Bidders including the successful Bidder will be returned when the successful Bidder has furnished the required Performance Security.

16.6 The Bid Security may be forfeited:

(a) if the Bidder withdraws his bid except as provided in Sub Clause IB.22.1;

(b) if the Bidder does not accept the correction of his Bid Price pursuant to Sub Clause IB.28.2 hereof; or

(c) in the case of successful Bidder, fails to furnish the required Performance Security.

16.7 In case of annulment, all Bids submitted and specially, Bid securities, shall be returned to the Bidders within 14 days of annulment.

IB.17 Alternative Proposals by Bidder

17.1 Unless otherwise specified in the **Bidding Data**, alternative proposal(s) shall not be considered.

17.2 Should any Bidder consider that he can offer any advantages to the Employer by a modification to the designs, specifications or other conditions, he may, in addition to his Bid to be submitted in strict compliance with the Bidding Documents, submit any alternative proposal(s) containing (a)

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relevant design calculations; (b) technical specifications; (c) proposed construction methodology; and (d) any otherrelevant details/conditions, provided always that the total sumentered on the Letter of Bid shall be that which represents complete compliance with the Bidding Documents.

17.3 Alternative proposal(s), if any, of the Bidder having submitted most advantageous Bid only may be considered by the Employer as the basis for the award of Contract to such Bidder.

IB.18 Format and Signing of Bid

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

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

18.3 No alteration is to be made in the Letter of Bid nor in the Schedules thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the Bid may be rejected.

18.4 Each Bidder shall prepare by filling in the forms completely and without alterations one (1) original and number of copies, specified in the **Bidding Data**, of the documents comprising the Bid as described in Clause IB.12 and clearly mark them "ORIGINAL" and 'COPY" as appropriate. In the event of discrepancy between them, the original shall prevail.

The Bidder shall also provide complete searchable PDF versions as well as Word, Excel, etc., versions of the Bid if so required in the **Bidding Data**.

18.5 The original of the Bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorizedto sign on behalf of the Bidder pursuant to Sub-Clause IB.12.1(d) hereof. All pages of the Bid shall be initialled and stamped by the person or persons signing the bid.

18.6 The Bid shall contain no alterations, omissions or additions, except to comply with instructions issued by the Employer, or as are necessary to correct errors made by the Bidder, in which case such corrections shall be initialled by the personor persons signing the Bid.

18.7 Bidders shall indicate in the space provided in the Letter of Bid their full and proper addresses at which notices may be legally served on them and to which all correspondence in connection with their bids and the Contract is to be sent.

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

18.9 All documents executed outside Pakistan required to be submitted with the Bid must be certified by Pakistani Embassy in the respective country(ies).

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D. SUBMISSION OF BIDS

IB.19 Sealing and Marking of Bids

19.1 Each Bidder shall submit his Bid as under:

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

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

19.2 The inner and outer envelopes shall:

(a) be addressed to the Employer at the address provided in the **Bidding Data**;

(b) bear the specific identification of this bidding process as specified in the **Bidding Data**; and

(c) provide a warning not to open before the time and date for bid opening, as specified in the **Bidding Data**.

19.3 In addition to the identification required in Sub-Clause IB.19.2 hereof, the inner envelope shall indicate the name andaddress of the Bidder to enable the Bid to be returned unopened in case it is declared "late" pursuant to ClauseIB.21.

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

IB.20 Deadline for Submission of Bids

20.1 (a) Bids must be received by the Employer at the address specified no later than the time and date stipulated in the **Bidding Data**.

(b) Bids with charges payable will not be accepted, nor will arrangements be undertaken to collect the bids from any delivery point other than that specified above. Bidders shall bear all expenses incurred in the preparation and delivery of Bids. No claims will be entertained for refund of such expenses.

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

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

20.2 The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an amendment in accordance with Clause IB.9, in which case all rights and obligations ofthe Employer and the Bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

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IB.21 Late Bids

21.1 (a) Any Bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.20 shall be declared late, rejected and returned unopened to such Bidder.

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

IB.22 Modification, Substitution and Withdrawal of Bids

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

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

22.3 No Bid may be modified by a Bidder after the deadline for submission of Bids except in accordance with Sub Clauses IB.22.1 and 28.2.

22.4 Withdrawal of a Bid during the interval between the deadline for submission of Bids and the expiration of the period of Bid validity specified in the Letter of Bid may result in forfeiture of the Bid security in pursuance to Clause IB.16.

E. BID OPENING AND EVALUATION

IB.23 Bid Opening

23.1 The Employer will open the Bids including withdrawals, substitution and modifications made pursuant to Clause IB.22, in the presence of Bidders' representatives who choose to attend, at the time, date and location stipulated in the **Bidding Data**. The Bidders' representatives who are present shall sign a register evidencing their attendance.

23.2 Envelopes marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause IB.22 shall not be opened. Only bids that are opened and read out at Bid opening shall be considered further.

23.3 The Bidder's name, total Bid Price and price of any alternative proposal(s), any discounts, Bid modifications**,** substitution and withdrawals, the presence or absence of Bid security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening of Bids. Only discounts and alternative proposals

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read out at Bid opening shall be considered for evaluation. The Letter of Bid and the Summary Bill of Quantities are to be initialled by representative(s) of the Employer attending Bid opening. The Employer shall neither discuss the merits ofany Bid nor reject any Bid (except for late Bids, in accordance with Sub-Clause IB 21.1).

23.4 The Employer shall prepare minutes of the Bid opening, including the information disclosed to those present in accordance with the Sub-Clause IB.23.3.

IB.24 Process to be Confidential

24.1 Information relating to the examination, clarification, evaluation and comparison of Bids and recommendations for the award of Contract shall not be disclosed to Bidders or any other person not officially concerned with such process before the announcement of the result of Bid evaluation in the form of final evaluation report giving justification for acceptance or rejection of Bids which shall be done at least fifteen (15) days prior to award of Contract. The announcement to all Bidders will include table(s) comprising read out prices, discounted prices, price adjustments made, final evaluated prices and recommendations against all the Bids evaluated. Any effort by a Bidder to influence the Employer's processing of Bids or Contract award decisions may result in the rejection of such Bidder's Bid. Whereas any Bidder feeling aggrieved may lodge a written complaint not later than five (5) days after the announcement of the final evaluation report.

IB.25 Clarification of Bids

25.1 To assist in the examination, evaluation and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdowns of unit rates and lump sum prices. Any clarification submitted by a Bidder that is not in response to a request by the Employer shall not be considered. The request for clarification and the response shall be in writing. No change in the price or substance of the Bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the Bids in accordance with Clause IB.28.

25.2 The Employer may, at his discretion, ask any Bidder for confirmation/submission of missing information to clarify its Bid. However, the Employer does not have an obligation to request any additional information or clarification with respect to missing or deficient information in a Bid. TheEmployer may reject any Bid as non-responsive if found materially incomplete, obscure, irregular or omitting any material information required to be submitted in accordance with the Bidding Documents.

25.3 If a Bidder does not provide clarifications of its Bid by the date and time set reasonably (not less than seven (7) days) in the Employer's request for clarification, the Employer may proceed with the evaluation based on the informationsubmitted in the Bid without waiting for the Bidder's response.

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IB.26 Examination of Bids and Determination of Responsiveness

26.1 Prior to the comparison of Bids, the Employer will determine whether each Bid is substantially responsive to the requirements of the Bidding Documents.

26.2 The Employer's determination of a Bid's responsiveness is to be based on the contents of the Bid itself, as defined in Sub-Clause IB.12.

26.3 A substantially responsive Bid is one which meets the requirements of the Bidding Documents, without material deviation, reservation or omission. A material deviation, reservation or omission is one that,

(a) if accepted, would:

(i) affect in any substantial way the scope, quality or performance of the Works; or

(ii) limit in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the Bidder's obligations under the proposed Contract; or

(b) if rectified, would unfairly affect the competitive position of other Bidders presenting substantially responsive Bids.

26.4 During the evaluation of Bids, the following definitions apply:

(a) "Deviation" is a departure from the requirements specified in the Bidding Documents;

(b) "Reservation" is the setting of limiting conditions or withholding from complete acceptance of therequirements specified in the Bidding Documents; and

(c) "Omission" is the failure to submit part or all of the information or documentation required in the Bidding Documents.

26.5 The Employer shall examine the technical aspects of the Bid submitted in accordance with Sub-Clause IB.12.1(f), in particular, to confirm that all requirements stated in Specifications have been met without any material deviation, reservation or omission.

26.6 If a Bid is not substantially responsive to the requirements of the Bidding Documents, it will be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation, reservation or omission.

IB.27 Nonmaterial Nonconformities

27.1 Provided that a Bid is substantially responsive, the Employer may waive any nonconformities in the Bid.

27.2 Provided that a Bid is substantially responsive, the Employer may request that the Bidder submit the necessary information or documentation, within a reasonable period of time, to rectify nonmaterial nonconformities in the Bid related to documentation requirements. Requesting information or

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documentation on such nonconformities shall not be related to any aspect of the price of the Bid. Failure of the Bidder to comply with the request may result in the rejection of its Bid.

27.3 Provided that a Bid is substantially responsive, the Employer shall rectify quantifiable nonmaterial nonconformities related to the Bid Price. To this effect, the Bid Price shall be adjusted, for comparison purposes only, to reflect the price of a missing or non-conforming item or component, by adding the average price of the item or component quoted by other lowest two evaluated substantially responsive Bidders. If the price of the item or component cannot be derived from the price of other substantially responsive Bids, the Employer shall use a suitable CSR, adjusted to the date 28 days earlierto the Bid submission date or its best assessment.

IB.28 Correction of Arithmetic Errors

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

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

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

(c) if there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected.

28.2 The amount stated in the Letter of Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and with the concurrence of the Bidder, shall be considered as binding upon the Bidder. If the Bidder does not accept the corrected Bid Price, his Bid will be rejected, and the Bid security shall be forfeited in accordance with Sub Clause IB.16.6(b) hereof.

IB.29 Evaluation and Comparison of Bids

29.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause IB.26. The Employer shall use the criteria and methodologies listed in this Clause. No other evaluation criteria or methodologies shall be permitted.

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

(a) making any correction for arithmetic errors pursuant to Clause IB.28;

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(b) price adjustment due to discounts offered in accordance with Sub-Clause IB.23.3;

(c) excluding Provisional Sums and the provision, if any, for contingencies in the Summary Bill of Quantities, but including competitively priced daywork;

(d) making an appropriate price adjustment for any quantifiable nonmaterial nonconformities in accordance with Sub-Clause IB.27.3; and

(e) the additional evaluation factors are specified in Section Evaluation Criteria and Qualification Updating Forms.

29.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bids' comparison.

IB.30 Abnormally Low Bids

30.1 If the Bid Price of the successful Bidder is more than 15% below the lower of the Employer's estimate of the cost of work to be performed under the Contract or average of other lowest two evaluated substantially responsive Bids, the Employer may require the Bidder to produce detailed price analyses for any or all items of the Bill of Quantities todemonstrate the internal consistency of those prices with the construction methods and schedule proposed. After evaluation of the price analyses, the Employer may require anadditional Performance Security by 10% of the difference of the Bid Price as determined hereinabove upto issuance of Taking Over Certificate at the expense of the successful Bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful Bidder under the Contract. The Bids having Bid Price lower than25% shall be liable to be rejected.

IB.31 Unbalanced or Front Loaded Bids

31.1 If the Bid of the successful Bidder is seriously unbalanced (Front Loaded) in relation to the average of other evaluated substantially responsive Bids, the Employer during execution of contract may pay against measured quantities of significantly higher quoted line item(s) rate(s) with respect to same line item(s) rate(s) determined from the average of other lowest two evaluated substantially responsive Bids as instructed by the Engineer. The balance line item(s) rate(s) may be paid against the same measured quantities at the time of issuance of Taking Over Certificate or as instructed by the Engineer.

F. AWARD OF CONTRACT

IB.32 Award Criteria

32.1 Subject to Clauses IB.33 and IB.39, the Employer will award the Contract to the Bidder whose Bid has been determined as most advantageous Bid (substantially responsive to requirements of the Bidding Documents with the lowest evaluated Bid Price).

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IB.33 Employer's Right to Annul the Bidding Process

33.1 Notwithstanding Clause IB.32, the Employer reserves the right to annul the bidding process and reject all Bids, at any time prior to award of Contract, without thereby incurring any liability to the affected Bidders or any obligation.

The Employer shall upon request communicate to any Bidder who submitted a Bid, the grounds for its rejection of all Bids but is not required to justify those grounds. Rejection of all Bids shall be notified to all Bidders promptly.

IB.34 Notification of Award

34.1 Prior to expiration of the period of Bid validity prescribed by the Employer, the Employer will notify the successful Bidder in writing ("Letter of Acceptance") that his Bid has been accepted. This letter shall name the sum which the Employer will pay the Contractor in consideration of the execution and completion of the Works by the Contractor as prescribed by the Contract (hereinafter and in the Conditions of Contract called the "Accepted Contract Amount").

The Letter of Acceptance will also state the remedies with respect to Sub-Clauses IB.30 & IB.31 if applicable.

34.2 No negotiation with the Bidder having submitted most advantageous Bid or any other Bidder shall be permitted, however, Employer may have clarification meetings before issuing Letter of Acceptance to get clarified any item in the Bid evaluation report.

34.3 The Letter of Acceptance/ notification of award and its acknowledgement/acceptance by the Bidder will constitutethe formation of the Contract, binding the Employer and the Bidder till signing of the formal Contract Agreement.

34.4 Upon furnishing by the successful Bidder of a Performance Security, the Employer will promptly notify the other Bidders that their Bids have been unsuccessful and return their Bid securities in accordance with Sub-Clause IB.16.5.

IB.35 Performance Security

35.1 The successful Bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Conditions of Contract and additional Performance Security if applicable under IB.30 as stated in the Letter of Acceptance, within a period of 28 days after the receipt of Letter of Acceptance.

35.2 Failure of the successful Bidder to comply with the requirements of Sub Clause IB.35.1 or Clauses IB.36 or IB.37 shall constitute sufficient grounds for the annulment of the award, forfeiture of the Bid security and to award the Contract to the Bidder having submitted next advantageous Bid.

IB.36 Signing of Contract Agreement

36.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will notify the successful Bidder to depute its representative with appropriate Power of Attorney to sign the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the parties.

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36.2 The formal Agreement between the Employer and the successful Bidder shall be executed within 14 days of the receipt of the above stated notification by the successful Bidder from the Employer.

IB.37 Integrity Pact

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

IB.38 Instructions not Part of Contract

38.1 Bids shall be prepared and submitted in accordance with the Instructions to Bidders which are provided to assist the Bidders in preparing Bids but do not constitute part of the Contract.

IB.39 Corrupt and Fraudulent Practices

39.1 The Employer will reject a Bid if it determines that the Bidder recommended for award, or any of its personnel, or its agents, or its sub-contractors, service providers, suppliers and/or their employees, has, directly or indirectly, engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices in competing for the contract under this bidding.

39.2 The Employer will blacklist and hence forthwith debar a Constructor or individual, at any time, in accordance with the prevailing Public Procurement Rules 2004.

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BIDDING DATA (BD)

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BIDDING DATA

The following specific data for the Works to be bid shall complement, amend, or supplement the provisions in the Instructions to Bidders. Wherever there is a conflict, the provisions herein shall prevail over those in the Instructions to Bidders.

IB Clause Reference	Bidding Data
1.1	Name and address of the Employer: Korangi Fisheries Harbour Authority (KoFHA) Chashma Goth, Rehri, District Malir, Karachi - Pakistan
1.1	Name of the Project & Scope of the Works: Name of the Project: Package-II: Establishment & Upgradation of Jetty and Related Structures Scope of Works: Project envisages the establishment and upgradation of the jetty and all associated marine and landside structures, including civil, structural, and ancillary works necessary for full operational functionality. The Works include site preparation, construction, rehabilitation, installation of required fixtures, and integration with existing infrastructure. The Contractor shall ensure compliance with all technical specifications, safety standards, and regulatory requirements. All works shall be executed using approved methodologies, qualified personnel, and suitable equipment to achieve the intended performance and durability.
1.2	Time for Completion for the Works: Three Hundred and Sixty Five (365) calendar days [12 calendar months]
2.1	Name of the Borrower/ Source of Funding: The Employer's own resources, loans or grants.
3.1	*Replace the text of Sub-Clause IB. 3.1 with the following:* This Invitation for Bids is open to all Bidders meeting the requirements specified in Qualification Document (Volume-I of the Bidding Documents).
4.4	*Replace the text of last line of Sub-Clause IB. 4.4 with the following:* https://www.dgip.gov.pk/visa/categories.php
7.1	*Replace the text of Sub-Clause IB. 7.1 with the following:* The Bidding Documents in addition to Invitation for Bids, are those as stated below and shall be read in conjunction with any Addenda issued in accordance with Clause IB.9:

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IB Clause Reference	Bidding Data
	BIDDING DOCUMENTS **VOLUME-I** • Qualification Document **VOLUME-II** • Instructions to Bidders. • Bidding Data. • Evaluation Criteria and Qualification Updating Forms. • Letter of Technical Bid • Schedules to Bid ▪ Schedule A to Bid: Schedule of Adjustment Data ▪ Schedule C to Bid: Construction Schedule ▪ Schedule D to Bid: Method of Performing the Work. ▪ Schedule E to Bid: List of Major Equipment ▪ Schedule F to Bid: Organization Chart for supervising staff and Labour. ▪ Schedule G to Bid: List of Subcontractors. ▪ Schedule I to Bid: Construction Camp and Housing Facilities ▪ Schedule J to Bid: Integrity Pact. • Standard Forms ▪ Form of Bid Security ▪ Form of Performance Security ▪ Letter of Acceptance ▪ Form of Contract Agreement ▪ DAAB Agreement ▪ Form of Mobilization Advance Guarantee/Bond (Not Used) • Conditions of Contract ▪ Part-I: General Conditions (GC) ▪ Part-II: Particular Conditions (PC) Part A - Contract Data; and Part B - Special Provisions **VOLUME-III** • Specifications (Civil, Plumbing / Piping and Electrical Works) **VOLUME-IV** • Bidding Drawings

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IB Clause Reference	Bidding Data
	VOLUME-V • Letter of Financial Bid • Schedules to Bid ▪ Schedule B to Bid: Bill of Quantities ▪ Schedule H to Bid: Estimated Progress Payments
8.1	Time limit for clarification: Seven (07) days.
8.2	Clarifications issued in response to bidders' queries shall be uploaded on E-PADS Version 2.0 and the same shall form an integral part of the Bidding Documents.
8.3	Venue, time, and date of the pre-Bid meeting: As notified by the Employer in Invitation for Bids.
8.5	Minutes of the Pre-Bid meeting shall also be uploaded on EPADS and shall form an integral part of the bidding documents.
9.3	Number of days: Seven (07) days.
11.1	Bid language: English
12.1	Replace the text of Sub-Clause IB. 12.1 with the following: Bids are invited from interested national construction firms as per Single Stage Two - Envelopes bidding procedure as stated in Pakistan Public Procurement Rules-36 (b). All bids shall be submitted through E-PADS Version 2.0, including the technical and financial proposals. Each bidder shall furnish all documents as specified below: **(A) Technical Bid** Technical Bid shall comprise the following documents: (a) Covering Letter; (b) Volume-I, II, III & IV of the Bidding Documents (duly signed and stamped); (c) Addendum/ Corrigendum, if any; (d) Duly filled in, signed and stamped Letter of Technical Bid and completed Schedules to Bid as required, in accordance with Clause IB. 18 hereof; (e) Bid Security in accordance with Clause IB.16 hereof; (f) A technical proposal taking into account the following Schedules to Bid: ▪ Schedule C to Bid: Construction Schedule. ▪ Schedule D to Bid: Method of Performing the Work.

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IB Clause Reference	Bidding Data
	▪ Schedule E to Bid: List of Major Equipment ▪ Schedule F to Bid: Organization Chart for supervising staff and Labour. ▪ Schedule G to Bid: List of Subcontractors. ▪ Schedule I to Bid: Construction Camp and Housing Facilities ▪ Schedule J to Bid: Integrity Pact. and other pertinent information, such as mobilization programme, etc. (g) A written power of attorney authorizing the signatory of the Bid to act for and on behalf of the Bidder. The name and position held by each person signing the authorization must be typed or printed below the signature; (h) Qualification Updating Forms: Not applicable due to post-qualification. **(B) Financial Bid** Financial Bid shall comprise the following documents: (a) Duly filled in, signed and stamped Letter of Financial Bid, in accordance with Clause IB. 18 hereof; (b) Volume-V of the Bidding Documents (duly filled-in, signed and stamped, in accordance with Clause IB. 18 comprising; ▪ Schedule B to Bid: Bill of Quantities ▪ Schedule H to Bid: Estimated Progress Payments
12.2	Maximum number of JV partners shall be: Two (02).
13.8	Following Sub-Clause IB. 13.8 is added: The rates and prices for all items of the Works stated in the Bill of Quantities shall be exclusive of Sindh Sales Tax on Construction Services.
14.1	Delete Sub-Clause IB. 14.1 in its entirety and replace with the following: The unit rates and the prices shall be quoted by the Bidder entirely in Pak Rupees and all payments shall be made in Pak Rupees only.
14.2	Sub-Clause 14.2 is deleted in its entirety.
15.1	Period of Bid Validity: One hundred and fifty two (152) calendar days after the deadline for Bid submission.
16.1	Amount of Bid Security: Not less than Pak. Rupees Ten Million (PKR 10,000,000/-).

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IB Clause Reference	Bidding Data
16.2	Replace the text with the following: The Bid Security shall be in the form of a Pay Order or a Bank Guarantee from Karachi based branch of any Scheduled Bank in Pakistan having long term PACRA/VIS rating of minimum AAA. The Bid Security shall be in favour of the Employer valid for a period of one hundred eighty (180) calendar days i.e. 28 calendar days beyond the bid validity date. The Bid Security of Joint Venture shall be in the name of Joint Venture or Lead/either Firm of the JV or in ratio of shares of the individual JV partners, submitting the bid. The Bid Security from an insurance company is not acceptable.
18.4	Number of copies of the Bid to be completed and submitted: All bids shall be submitted electronically through E-PADS Version 2.0.
19.1	Delete Clause IB. 19 in its entirety and substituted with following: Each bidder shall submit his bid electronically through E-PADS Version 2.0.
19.2	Following Sub-Clause IB. 19.2 is added: The Technical Bid should comprise of documents listed in Sub-Clause IB. 12.1 (A) of Bidding Data & the Financial Bid should comprise of documents listed in Sub-Clause IB. 12.1 (B) of Bidding Data.
20.1(a)	Bids shall be submitted electronically through E-PADS Version 2.0. However, the original instrument of Bid Security must be submitted to the Employer's office before the closing date and time as mentioned in the NIT. Deadline for submission of Bids: As notified by the Employer in the Invitation for Bids.
23 **23.1** **23.2**	Replace the text of Clause IB. 23 with the following: **Opening of Technical Bids** The Employer will open the Technical Bids electronically through E-PADS Version 2.0 including withdrawals, substitution and modifications made pursuant to Clause IB.22, in public at the address, date and time specified in the Invitation for Bids, in the presence of Bidders` designated representatives and anyone who choose to attend. The Financial Bids will remain unopened. The Bidders' representatives who are present shall sign a register evidencing their attendance. Envelopes marked "MODIFICATION", "SUBSTITUTION" or "WITHDRAWAL" shall be opened and read out first. Bids for which an acceptable notice of withdrawal has been submitted pursuant to Clause IB.22 shall not be opened. Only bids that are opened and read out at Bid

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IB Clause Reference	Bidding Data
23.3	The Bidder's name, Bid modifications, substitution and withdrawals, the presence or absence of Bid Security, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening of Technical Bids. Only Technical Bids read out at Technical Bid opening shall be considered for evaluation. The Letter of Technical Bid is to be initialled by representative(s) of the Employer attending Bid opening. The Employer shall neither discuss the merits of any Bid nor reject any Bid (except for late Bids, in accordance with Sub-Clause IB. 21.1).
23.4	The Employer shall prepare minutes of the Technical Bid opening, including the information disclosed to those present in accordance with the Sub-Clause IB.23.3 of Bidding Data.
23.5	The Employer shall examine and determine whether each Technical Bid is substantially responsive to the requirements of the Bidding Documents in accordance with the Clause IB.26 of Instructions to Bidders.
23.6	At the end of the evaluation of the Technical Bids, the Employer will invite only those bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Financial Bids.
23.7	The date, time, and location of the opening of Financial Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice for the opening of Financial Bids.
23.8	The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially non-responsive to the requirements of the Bidding Document and return their Financial Bids unopened before inviting others, who are determined as being qualified, to attend the opening of Financial Bids.
	Opening of Financial Bids
23.9	The Employer shall conduct the opening of Financial Bids of all Bidders who submitted substantially responsive Technical Bids electronically through E-PADS Version 2.0, publicly in the presence of Bidders` representatives who choose to attend at the address, date and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.
23.10	The Bidder's name, total Bid Price, any discounts, Bid modifications, substitution and withdrawals, and such other details as the Employer may consider appropriate, will be announced by the Employer at the opening of Financial Bids. Only Financial Bids and discounts that are opened and read out at Financial Bid opening shall be considered for evaluation. The Letter of Financial Bid and the Summary Bill of Quantities are to be initialled by representative(s) of the Employer attending Bid opening. The Employer shall neither discuss the merits of any Bid nor reject any Bid. The Employer shall prepare minutes of the Financial Bid opening,

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<table>
<tr><th>IB Clause Reference</th><th>Bidding Data</th></tr>
<tr><td>23.11</td><td>including the information disclosed to those present in accordance with the Sub-Clause IB.23.10 of Bidding Data.</td></tr>
<tr><td>26.6</td><td>In third line after the word “by”, add the text “omission, addition, alteration,” and in forth line after the word “withdrawal”, add the text “in any form”.</td></tr>
<tr><td>26.7</td><td>Following Sub-Clause IB. 26.7 is added:

Criteria for Evaluation of Technical Bids

Evaluation of Technical Bids shall be carried out as per the following criteria:

<table>
<tr><th>S. No.</th><th>Description</th><th>Pass / Fail Requirements</th></tr>
<tr><td>1.</td><td>Schedule C to Bid: Construction Schedule

Evaluation of the feasibility of the proposed construction schedule, alignment with project timelines, and logical sequencing of activities.</td><td>Pass: The proposed schedule must be realistic, aligned with project timelines, and show a logical sequence of major activities and milestones.
Fail: Schedule is unrealistic or incomplete.</td></tr>
<tr><td>2.</td><td>Schedule D to Bid: Method of Performing the Work

Assessment of the bidder’s method for executing the work, including efficiency, alignment with best practices, and risk mitigation. This should demonstrate a clear understanding of project requirements, particularly the methodology for inspection, repair, strengthening, and rehabilitation of existing jetty structures in a marine environment.</td><td>Pass: The method statement must demonstrate a practical, technically sound, and well-sequenced approach to the execution of the works, including a detailed methodology for repair and rehabilitation of jetty structures, with adequate safety, environmental protection, and risk mitigation measures.
Fail: The method statement lacks sufficient technical detail, does not adequately address the repair methodology for jetty structures, or fails to demonstrate alignment with project requirements.</td></tr>
</table>
</td></tr>
</table>

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IB Clause Reference	Bidding Data		
	3.	**Schedule E to Bid: List of Major Equipment** Review of the adequacy and suitability of major equipment (owned, purchased or leased) for the project needs, considering capacity, condition, present location/ source, plan for delivery at Site and period of work on the project.	**Pass**: Major equipment is suitable, sufficient, and maintained per project requirements. **Fail**: Equipment is inadequate, inappropriate, or does not meet project standards.
	4.	**Schedule F to Bid: Organization Chart for supervising staff and Labour** Assessment of the organization chart for supervisory staff, including roles, responsibilities, and qualifications of key personnel.	**Pass**: Chart clearly defines roles, reporting structure, and includes qualified supervisory staff with qualification and relevant responsibilities and experience. **Fail**: Organization chart is unclear or lacks qualified personnel.
	5.	**Schedule G to Bid: List of Subcontractors** Review of subcontractors proposed for critical tasks, including their qualifications and experience relevant to project requirements.	**Pass**: Provide list of Subcontractors and proposed task assigned to them along with their qualification and relevant experience in the proposed scopes. **Fail**: Subcontractor list lacks the proposed task assigned to them and relevant qualifications or does not meet project needs.
	6.	**Schedule I to Bid: Construction Camp and Housing Facilities** Assessment of proposed camp and housing facilities for staff, including site preparation, provision of services, construction of facilities, construction equipment assembly & preparation, safety & security.	**Pass**: Facilities are adequate, safe, and meet project requirements. **Fail**: Facilities are insufficient, unsafe, or non-compliant with project requirements.
	7.	**Schedule J to Bid: Integrity Pact** Confirmation that the bidder has signed and committed to the Integrity Pact, ensuring	**Pass**: Integrity Pact is signed and included in bid as per the prescribed format given in the

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<table>
<tr><th>IB Clause Reference</th><th>Bidding Data</th></tr>
<tr><td></td><td>
<table>
<tr><td></td><td>transparency and ethical conduct throughout the project.</td><td>Bidding Documents. Fail: Integrity Pact is missing, unsigned or not meeting the Bidding Documents' requirements.</td></tr>
</table>
</td></tr>
<tr><td>26.8</td><td>Following Sub-Clause IB. 26.8 is added:

Criteria for Evaluation of Financial Bids

Financial Bids shall be examined, evaluated and compared by the Employer to determine the most advantageous Bid (substantially responsive to requirements of the Bidding Documents with the lowest evaluated Bid Price). The Bid found to be the "most advantageous Bid" shall be accepted.</td></tr>
<tr><td>29.2(b)</td><td>Replace the text "IB.23.3" with "IB.23.10 of Bidding Data".</td></tr>
<tr><td>35.1</td><td>Standard form and amount of Performance Security acceptable to the Employer: An amount equal to 10% of the Accepted Contract Amount in the form of a Bank Guarantee from Karachi based branch of any scheduled bank in Pakistan with at least AAA PACRA/ VIS rating within 28 Days after the receipt of the Letter of Acceptance.</td></tr>
</table>

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EVALUATION CRITERIA AND QUALIFICATION UPDATING FORMS

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EVALUATION CRITERIA AND QUALIFICATION UPDATING FORMS

1. General

This Section contains Eligibility and Qualification Criteria that the Employer shall use to evaluate Bids and qualify Bidders in accordance with Clauses IB.26 of Instructions to Bidders. The Bidder shall provide all the information requested in the relevant forms contained in Bidder's Qualification Updating Forms provided herein.

The information provided in the forms shall be substantiated with valid documentary evidences otherwise the requirement will not be considered as complied.

Wherever a Bidder is required to state a monetary amount, Bidders shall indicate the PKR equivalent using the rate of exchange determined as follows:

- For financial data - Exchange rate prevailing on the last day of the respective calendar year (in which the amounts for that year are to be converted) was originally established.

Exchange rates shall be taken from the TT Selling Rates published or authorized by the State Bank of Pakistan. Any error in determining the exchange rates in the Bid may be corrected by the Employer.

Not Used

2. Domestic Preference

A margin of preference of 7.5% (seven and a half percent) shall be granted to domestic Bidders (in case of JV, all partners are Pakistani Constructors), in accordance with and subject to the following provisions:

(a) The Bidders 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 Employer, a Bidder qualifies for a domestic preference.

(b) After Bids have been received and reviewed by the Employer, responsive Bids shall be classified into the following groups:

(i) Group A: Bids offered by domestic Bidders eligible for the preference.

(ii) Group B: Bids offered by other Bidders.

All evaluated Bids in each group shall, as a first evaluation step, be compared to determine the lowest Bid, and the lowest evaluated 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 lowest, it shall be selected for the award. If a Bid from Group B is the lowest, as a second evaluation step, all Bids from Group B shall then be further compared with the lowest evaluated Bid from Group A. For the purpose of this further comparison only, an amount equal to 7.5% (seven and a half percent) of the respective Bid Price corrected for arithmetical errors, including unconditional discounts and excluding Provisional Sums and the cost of dayworks, if any, shall beadded to the evaluated price offered in each Bid from Group B. If the Bid from Group A is the lowest, it shall be selected for award. If not, the lowest evaluatedBid from Group B based on the first evaluation step shall be selected.

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3. Evaluation (IB 29.2(e))

In addition to the criteria listed in IB 29.2 (a) - (d) the following criteria shall apply:

3.1 Assessment of adequacy of Technical Proposal with Requirements

3.2 Multiple Contracts

Not applicable**.**

3.3 Price Adjustments

Not applicable**.**

Not Used

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

NESPAK Karachi

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4. Qualification (Updating of Pre-Qualification)

Eligibility and Qualification information described here below must be met by the legal entity(ies) comprising the Bidder, and not the Bidder's/JV partner's sister or parent companies, subsidiaries or affiliates.

Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
1. Eligibility							
1.1	**PEC Licencing**	Licencing by Pakistan Engineering Council (PEC) as per requirement mentioned in Pre-Qualification Document.	must meet requirement	must meet requirement	must be PEC Licensee	N/A	Provisional/ Standard PEC Licence. Foreign Constructor must submit JV Agreement with Pakistani Constructor.
1.2	**Pakistani Constructor's Tax Registration**	Requirement of Pakistani Constructor on Active Taxpayer List (ATL) of FBR in accordance with paragraph (c) of Sub-Clause IB.3.1.	must meet requirement	N/A	must meet requirement	N/A	Extracts of ATL
1.3	**Debarment/Blacklisting**	Not having been debarred/blacklisted in accordance with paragraph (d) of Sub-Clause IB.3.1.	Must meet requirement	N/A	Must meet requirement	N/A	Undertaking in the Letter of Bid

Not Used

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
2. Pending Litigation							
2.1	**Pending Litigation**	Bidder's financial position and prospective long term profitability sound according to criteria established in 3.1 below and assuming that all pending litigation will be resolved against the Bidder.	Must meet requirement	N/A	Must meet requirement	N/A	Form CON – 1
3. Financial Situation and Performance ***[Requirements as prescribed in the Qualification Documents]***							
3.1	**Financial Capabilities**	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the construction cash flow requirements for the execution of the Works.	Must meet requirement	Must meet requirement	N/A	N/A	Form FIN – 3.1, FIN – 3.2, FIN – 3.3, with attachments

Not Used

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Eligibility and Qualification Criteria			Compliance Requirements				Documentation
No.	Subject	Requirement	Single Entity	Joint Venture			Submission Requirements
				All Partners Combined	Each Member	Lead Member	
		(ii) The Bidders shall also demonstrate, to the satisfaction of the Employer, that it has adequate sources of finance to meet the cash flow requirements on works currently in progress and for future contract commitments. (iii) The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, for the last three years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospectivelong-term profitability.	Must meet requirement Must meet requirement	Must meet requirement N/A	N/A Must meet requirement	N/A N/A	

Not Used

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Bidders Qualification Updating Forms

To establish its qualifications to perform the contract in accordance with Section (EvaluationCriteria and Qualification Updating Forms) the Bidder shall provide the information requested in the corresponding Information Sheets included hereunder.

Not Used

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

Form ELI -1.1

Bidder Information Form

Date: _____
Bid Reference No. (if any) and title: _____
Page _____ of _____ pages

Bidder's name
In case of Joint Venture (JV), name of each member:
Bidder's country of registration: *[indicate country of Constitution]*
Bidder's year of incorporation:
Bidder's legal address [in country of registration]:
Bidder's authorized representative information Name:_____ Address:_____ Telephone/Fax numbers: _____ E-mail address: _____
1. Attached are copies of original documents, in case of JV, JV agreement, in accordance withSub-Clause IB 3.1.

Not Used

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

Form ELI -1.2

Bidder's JV Information Form
(to be completed for each member of Bidder's JV)

Date: _____
Bid Reference No. (if any) and title: _____
Page _____ of _____ pages

Bidder's JV name:
JV member's name:
JV member's country of registration:
JV member's year of constitution:
JV member's legal address in country of constitution:
JV member's authorized representative information Name:_____ Address:_____ Telephone/Fax numbers: _____ E-mail address: _____

Not Used

Form CON – 1

Pending Litigation

Bidder's Name: _____

Date: _____

JV Member's Name_____

Bid Reference No. (if any) and title: _____

Page ____ of _____ pages

Pending Litigation, in accordance with Eligibility and Qualification Criteria			
□ No pending litigation in accordance with Eligibility and Qualification Criteria, Sub-Factor 2.1. □ Pending litigation in accordance with Eligibility and Qualification Criteria, Sub-Factor 2.1 as indicated below.			
Year of dispute	**Amount in dispute (currency)**	**Contract Identification**	**Total Contract Amount (currency), Eq. PKR (exchange rate)**
		Contract Identification: _____ Name of Employer: _____ Address of Employer: _____ Matter in dispute: _____ Party who initiated the dispute: ____ Status of dispute: _____	
		Contract Identification: Name of Employer: Address of Employer: Matter in dispute: Party who initiated the dispute: Status of dispute:	

Not Used

Form FIN – 3.1:

Financial Situation and Performance

Bidder's Name: _____

Date: _____

JV Member's Name_____

Bid Reference No. (if any) and title: _____

Page ____ of _____ pages

1. Financial data

Type of Financial information in (currency)	**Historic information for last year, (amount in currency, currency, exchange rate*, Eq. PKR)**
Statement of Financial Position (Information from Balance Sheet)	
Total Assets (TA)	
Total Liabilities (TL)	
Total Equity/Net Worth (NW)	
Current Assets (CA)	
Current Liabilities (CL)	
Working Capital (WC)	
Information from Income Statement	
Total Revenue (TR)	
Profits Before Taxes (PBT)	
Cash Flow Information	
Cash Flow from Operating Activities	

Not Used

* For the exchange rate, refer Clause 1, "General" of Evaluation Criteria and Qualification Updating Forms.

2. Financial documents

The Bidder and its parties shall provide copies of financial statements for last year pursuant to Eligibility and Qualification Criteria, Sub-factor 3.1. The financial statements shall:

(a) reflect the financial situation of the Bidder or in case of JV member, and not an affiliatedentity (such as parent company or group member).

(b) be independently audited or certified in accordance with local legislation.

(c) be complete, including all notes to the financial statements.

(d) correspond to accounting periods already completed and audited.

☐ Attached are copies of financial statements[1] for the last year required above; and complying withthe requirements

[1] If the most recent set of financial statements is for a period earlier than 12 months from the date of bid, the reason for this should be justified.

Form FIN – 3.2:

Financial Resources

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

Financial Resources		
No.	**Source of financing**	**Amount (Eq. PKR)**
1		
2		
3		

Not Used

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

Form FIN – 3.3:

Current Contract Commitments / Works in Progress

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

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

Not Used

LETTER OF TECHNICAL BID
AND
SCHEDULES TO BID

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LETTER OF TECHNICAL BID

[on Bidder's letter head]

Bid Reference No. _____ Date: _____

[Name of Contract/ Works]

To: _____

_____

Gentleman,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Specifications, Schedules to Bid including Bill of Quantities, Drawings and Addenda Nos._____for the execution of the above-named Works, we, the undersigned, offer to execute and complete such Works and remedy any defects therein in conformity with the said Bidding Documents and Addenda.

2. We meet the eligibility requirements in accordance with IB.3.

3. We, including any Subcontractors for any part of the Contract, are not debarred/ blacklisted by the Employer, any Government/Semi Government/Public Department in Pakistan or foreign country, international organizations or other foreign institutions.

4. Our subcontractors or suppliers for any part of the Contract, if any, shall have nationalities from eligible countries, in accordance with IB.4.4.

5. We understand that all the Schedules attached hereto form part of this Bid.

6. As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of PKR_____(Pak. Rupees. _____) drawn in your favour or made payable to you and valid for a period of_____days beginning from the date Bids are opened.

7. We undertake, if our Bid is accepted, to commence the Works and to complete the whole of the Works comprised in the Contract within the time stated in Contract Data.

8. We agree to abide by this Bid for the period of_____days, inclusive of 28 days beyond Bid validity period (as mentioned at Sr. No. 6 above) and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

9. Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

10. We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other Bidder for the Works.

11. We understand that you are not bound to accept the lowest or any Bid you may receive.

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12. We undertake that all the information and documents submitted with the Bid are genuine, and in case of incorrect information of fake documents we shall be liable for punitive action under the Applicable Law.

Dated this_____day of_____20_____

Signature: _____

in the capacity of_____duly authorized to sign Bids for and on behalf of

_____

(Name of Bidder in Block Capitals)
(Seal)

Address:_____

_____

_____

Witness:

Signature:_____

Name: _____

Address. _____

_____

Occupation_____

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A-1
Schedule-A to Bid

SCHEDULE OF ADJUSTMENT DATA

Schedule of Cost Indexation

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

Pn= a + b Ln / Lo + c En/ Eo + d Mn/Mo + ...

where:

"Pn" is the adjustment multiplier to be applied to the estimated Contract value in the relevant currency of the work carried out in period "n", this period being a month;
"a" is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;

"b", "c", "d", ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

"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 particularPayment 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.

The weightings (coefficients) for each of the factors of cost stated in the following table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variation(s).

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A-2
Schedule-A to Bid

SCHEDULE OF ADJUSTMENT DATA

The source of indices and the weightages or coefficients for use in the adjustment formula under Sub-Clause 13.7 of Conditions of Contract shall be as follows:

Cost Element	Description	Weightages	Applicable index
(i)	Fixed Portion	0.36	
(ii)	Local Labour[1]	0.25	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.
(iii)	Cement – in bags. Portland cement shall be considered representative items for all types of cement.	0.09	"
(iv)	Steel Reinforcement[2]	0.10	"
(v)	High Speed Diesel (HSD)	0.20	"
	Total	1.00	

Notes:

a) The base cost indices or prices shall be those applying 28 days prior to the latest day for submission of bids. Current indices or prices shall be those applying 28 days prior to the last day of the billing period.

b) Any fluctuation in the indices or prices of materials other than those given above shall not be subject to adjustment of the Contract Price.

c) For item (ii) above, in the weightage factor of labour, the effect of skilled, semi-skilled and unskilled labour has been taken. However, for the calculation purpose, the base and current price shall be taken from Federal Bureau of Statistics Bulletin for unskilled labour.

d) For item (iii) above, the rate of ordinary Portland cement (referred as "cement" in the said statistical Bulletin) per bag shall be used.

e) For item (iv) above, In the weightage factor of Steel Reinforcement, the effect of various types of steel has been taken. However, for the calculation purpose, the base and current price shall be taken from Federal Bureau of Statistics Bulletin for Iron bars ½'' round (M.S. bars per tonne).

f) For the purpose of this Sub-Clause, the rates for Karachi shall be used.

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A-3
Schedule-A to Bid

SCHEDULE OF ADJUSTMENT DATA

Table II. Foreign Currency (FC) For Bill Nos._____

NOT USED

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

A-4
Schedule-A to Bid

SCHEDULE OF ADJUSTMENT DATA

Table III. Foreign Currency Requirements

NOT USED

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt.) Ltd. NESPAK Karachi

A-5
Schedule-A to Bid

SCHEDULE OF ADJUSTMENT DATA

Table IV. Summary of Payment Currencies

NOT USED

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

B-1
Schedule-B to Bid

BILL OF QUANTITIES

Refer Volume-V of the Bidding Documents.

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C-1
Schedule-C to Bid

CONSTRUCTION SCHEDULE

Pursuant to Sub-Clause 8.3 of the General Conditions, the whole of the Works, and each Section (if any), shall be completed within the Time for Completion for the Works or Section (as the case may be) stated as hereunder and mentioned in Contract Data:

Description	Time for Completion (days)
Whole Works	Twelve (12) Calendar Months.

[The Bidder shall provide, the Construction Schedule in the bar chart (CPM, PERT or any other to be specified herein) showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works and Sections of the Works may meet Employer's completion targets in days noted above and counted from the Commencement Date (Attach sheets as required for the specified form of Construction Schedule)]

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D-1
Schedule-D to Bid

METHOD OF PERFORMING THE WORK

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

1. Organization Chart:

   Shall indicate head office and field office personnel involved in management and supervision, engineering, equipment maintenance and purchasing.

2. Mobilization:

   In Pakistan, the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.

3. Method of executing the Works:

   The procedures for installation of equipment and machinery and transportation of equipment and materials to the site.]

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E-1
Schedule-E to Bid

LIST OF MAJOR EQUIPMENT

[The Bidder will provide on Sheet E-2 of this Schedule *a list of all major equipment and related items, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment.*

The Bidder shall provide adequate information to demonstrate clearly that it has the capability to meet the requirements for the key equipment listed in Sheet E-3.]

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E-2
Schedule-E to Bid

LIST OF MAJOR EQUIPMENT

Owned, Purchased or Leased

Owned Purchased or Leased	Description of Unit (Make, Model, Year)	Capacity HP Rating	Condition	Present Location or Source	Date of Delivery at Site	Period of Work on Project
1	2	3	4	5	6	7
a. Owned						
b. To be Purchased						
c. To be arranged on Lease						

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E-3
Schedule-E to Bid

LIST OF MAJOR EQUIPMENT

Equipment details

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 ☐ Owned ☐ Rented ☐ Leased ☐ Specially manufactured	
The following information shall not be applicable 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	

[This Table shall be used for each item of Equipment separately]

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F-1
Schedule-F to Bid

ORGANIZATION CHART
FOR THE
SUPERVISORY STAFF AND LABOUR

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G-1
Schedule-G to Bid

LIST OF SUBCONTRACTORS

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

Enclosed are documentation outlining experience of subcontractors, the curriculum vitae and experience of their key personnel who will be assigned to the Contract, equipment to be supplied by them, size, location and type of contracts carried out in the past.

Part of Works (Give Details)	Subcontractor (With Complete Address)
1	2

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H-1
Schedule-H to Bid

ESTIMATED PROGRESS PAYMENTS

Refer Volume-V of the Bidding Documents.

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I-1
Schedule-I to Bid

CONSTRUCTION CAMP AND HOUSING FACILITIES

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

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

1. *Site Preparation (clearing, land preparation, etc.).*

2. *Provision of Services.*

- *a) Electrical power (expected power load, etc.).*
- *b) Water (required amount and system proposed).*
- *c) Sanitation (sewage disposal system, etc.)*

3. *Construction of Facilities*

- *a) Contractor's Office. Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).*
- *b) Warehouses and Storage Areas (area required, type of construction and layout).*
- *c) Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction, etc.).*

4. *Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).*

5. *Other Items Proposed (Security services, etc.)]*

Note:

The Contractor shall be responsible for pumps, electrical power, water and electrical distribution systems, and sewerage system including all fittings, pipes and other items necessary for servicing the Contractor's construction camp.

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J-1
Schedule-J to Bid

INTEGRITY PACT

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

Contract No._____ Dated _____
Contract Value: _____
Contract Title: _____

…… [Name of Bidder/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 (GoP) or any administrative subdivision or agency thereof or any other entity owned or controlled by GoP through any corrupt business practice.

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

[Name of Bidder/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, representation or warranty.

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

Notwithstanding any rights and remedies exercised by GoP in this regard, [name of Bidder/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 Bidder/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.

Name of Employer: ……
Signature: ……
[Seal]

Name of Bidder/Contractor: ……
Signature: …….
[Seal]

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STANDARD FORMS

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BS-1

FORM OF BID SECURITY

Security Executed on _____
(Date)

Expiry on _____
(Date)

Name of Surety with Address: _____

_____

Name of Principal (Bidder) with Address _____

_____

Penal Sum of Security PKR_____(Pak Rupees _____
_____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal (Bidder) we, the Surety above named, are held and firmly bound unto_____
(hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated_____for _____
_____(*Particulars of Bid*) to the said Employer; and

(1) WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum to the Employer, conditioned as under: that the Bid Security shall remain in force for a period twenty eight (28) days beyond the Bid Validity date i.e., up to_____.

(2) that the Bid Securities of the Bidders except the lowest three will be returned by the Employer within twenty eight (28) days from the opening of Bids, provided a Bidder request for the return of its Bid Security, or on the expiry of original validity of Bid Security or as extended, whichever is earlier;

(3) that the Bid Security of the lowest three Bidders comprising the successful Bidder will be returned when the successful Bidder has furnished the required Performance Security; and

(4) that in the event of failure of the successful Bidder to furnish the required Performance Security, the entire said sum be paid immediately to the said Employer pursuant to IB.16 and IB.35 of the Instructions to Bidders for the successful Bidder's failure to perform.

NOW THEREFORE, if the successful Bidder shall, within the period specified therefor, on the prescribed form presented to him for signature enter into a formal Contract with the said Employer in accordance with his Bid as accepted and furnish within twenty eight (28) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise toremain in full force and effect.

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BS-2

PROVIDED THAT the Surety shall forthwith pay the Employer the said sum upon first written demand of the Employer (without cavil or argument) and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Surety at its address given above.

PROVIDED ALSO THAT the Employer shall decide, whether the Principal (Bidder) has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Surety shall pay without objection the said sum upon demand from the Employer forthwith and without any reference to the Principal (Bidder) or any other person.

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

SURETY
(Scheduled Bank)

WITNESS:

Signature _____

1. _____

Name _____

_____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

_____

Name, Title & Address

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PS-1

FORM OF PERFORMANCE SECURITY

Guarantee No._____
Executed on _____
Expiry date _____

[Letter by the Guarantor to the Employer]

Name of Guarantor with address: _____

_____

Name of Principal (Contractor) with address:_____

_____

Penal Sum of Security (*express in words and figures*) _____

_____

Letter of Acceptance No._____Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the _____ (hereinafter called the Employer) in the penal sum of the amount stated above for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has accepted the Employer's above said Letter of Acceptance for_____

_____ (*Name of Contract*) for the _____

_____ (*Name of Project*).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause11, Defects After Taking Over, of Conditions of Contract are fulfilled.

Our total liability under this Guarantee is limited to the sum stated above and it is a condition of any liability attaching to us under this Guarantee that the claim for payment in writing shall be received by us within the validity period of this Guarantee, failing which we shall be discharged of our liability, if any, under this Guarantee.

We,_____ (the Guarantor), waiving all objections and defense under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments

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and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

PROVIDED ALSO THAT the Employer shall decide, whether the Principal (Contractor) has duly performed his obligations under the Contract or has defaulted in fulfilling said obligations and the Guarantor shall pay without objection any sum or sums up to the amount stated above upon first written demand from the Employer forthwith and without any reference to the Principal or any other person.

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

Guarantor
(Scheduled Bank)

WITNESS:

Signature _____

1. _____

Name _____

_____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

_____

Name, Title & Address

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LOA-1

Letter of Acceptance

[Letterhead paper of the Employer]

NAME OF CONTRACT:_____

CONTRACT NUMBER:_____

TO :_____

Date:_____

Your Reference:_____

Our Reference:_____

We thank you for your Bid dated _____ for the execution and completion of the Works comprising the above-named Contract and remedying of defects therein, all in conformity with the terms and conditions contained in the Contract.

We have pleasure in accepting your Bid for the Accepted Contract Amount of:

_____
[currency and amount in figures]

_____
[currency and amount in words]

In consideration of you properly and truly performing the Contract, we agree to pay you the Accepted Contract Amount or such other sums to which you may become entitled under the terms of the Contract, at such times and as prescribed by the Contract.

We acknowledge that this Letter of Acceptance creates a binding Contract between us, and we undertake to fulfil all our obligations and duties in accordance with the terms of this Contract.

You are required to furnish the Performance Security 10% of the Accepted Contract Amount within a period of 28 days after the receipt of Letter of Acceptance as per Sub-Clause IB. 35.1 of Instruction to Bidders and Sub-Clause 4.2 of Conditions of Contract.

You are also required to furnish an additional Performance Security within a period of 28 days after the receipt of Letter of Acceptance as per Sub-Clause IB. 35.1 of Instruction to Bidders and Sub-Clause 4.2 of Conditions of Contract. The additional Performance Security shall be 10% of the difference between the Accepted Contract Amount and the Engineer's estimate. The additional Performance Security shall be in the same form as the original Performance Security and shall be valid and enforceable until the date of issuance of the Taking-Over Certificate. *[add this para in case additional Performance Security is applicable under Clause IB. 30 of Instructions to Bidders and Sub-Clause 4.2 of Conditions of Contract]*

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The list of significantly higher quoted line item(s) rate(s) pursuant to Sub-Clause 14.16 of Conditions of Contract is attached with this Letter of Acceptance. *[add this para in case of unbalanced or front-loaded Bid under Clause IB. 31 of Instructions to Bidders and Sub-Clause 14.16 of Conditions of Contract]*

Signature:_____

Signed by: _____

For and on behalf of:_____

Date:_____

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CA-1

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of _____ (month) 20____ between _____ _____(hereinafter called the "Employer") of the one part and_____(hereinafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz.,_____ _____ should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnessed as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents, in the order of priority, after incorporating addenda, if any, except those parts relating to Instructions to Bidders shall be deemed to form and be read and construed as part of this Agreement:
   a) This Contract Agreement;
   b) The Letter of Acceptance;
   c) The Letter of Technical and Financial Bid;
   d) The Particular Conditions Part A - Contract Data;
   e) The Particular Conditions Part B - Special Provisions;
   f) The General Conditions;
   g) The Specifications;
   h) The Drawings;
   i) The Completed Schedules to Bid including Bill of Quantities; and
   j) Any other documents forming part of the Contract

   The addenda/corrigenda, if any, (Excluding part relating to Instructions to Bidders along with Bidding Data) shall be deemed to have been incorporated at the appropriate places in the "Documents forming the Contract".

3. In consideration of the payments to be made by the Employer to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Employer to execute and complete the Works and remedy defects therein in conformity and in all respects with the provisions of the Contract.

4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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IN WITNESS WHEREOF the parties hereto have caused this Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of Contactor	Signature of Employer
(Seal)	(Seal)

Signed, Sealed and Delivered in the presence of:

Witness	Witness
(Name, Title and Address)	(Name, Title and Address)

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DAAB-1

DAAB Agreement

[*All italicised text and any text within square brackets (except sub-clause headings) in this form of agreement is for use in preparing the form and should be deleted from the final product*].

Name and details of the Contract _____

_____

This Agreement made the_____day of_____[*month*],_____[*year*], between

Name and contact details of the Employer _____ (name)

_____ (*address*)

_____ (*telephone*)

_____(*email / other contact details*);

Name and contact details of the Contractor _____ (name)

_____ (*address*)

_____(*telephone*)

_____(*email / other contact details*);

Name and contact details of the DAAB Member _____ (name)

_____(*address*)

_____ (*telephone*)

_____(*email / other contact details*);

("**DAAB Agreement**")

Whereas:

A. the Employer and the Contractor have entered (or intend to enter) into the Contract;
B. under the Contract, the "**DAAB**" or "**Dispute Avoidance/Adjudication Board**" means the sole member or three members (as stated in the Contract Data of the Contract) so named in the Contract, or appointed under Sub-Clause 21.1 [*Constitution of the DAAB*] orSub-Clause 21.2 [*Failure to Appoint DAAB Members*] of the Conditions of Contract;
C. the Employer and the Contractor desire jointly to appoint the above-named DAAB Member to act on the DAAB as:
    a. the sole member of the DAAB, and where this is the case, all references to the "Other Members" do not apply; or
    b. one of three members / chairman [*delete the one which is not applicable*] of the DAAB and, where this is the case, the other two persons are:

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DAAB-2

_____ *(name)*	_____ *(name)*
_____ *(address)*	_____ *(address)*
_____*(telephone)*	_____*(telephone)*
_____*(email/ other contact details)*	_____ *(email/ other contact details)*

the "**Other Members**"; and

D. the DAAB Member accepts this appointment.

The Employer, Contractor and DAAB Member jointly agree as follows:

1. The conditions of this DAAB Agreement comprise:

   (a) Clause 21 [*Disputes and Arbitration*] of the Conditions of Contract, and any other provisions of the Contract that are applicable to the DAAB's Activities; and

   (b) the "General Conditions of Dispute Avoidance/Adjudication Agreement", which is appended to the General Conditions of the "Conditions of Contract for Construction" Second Edition 2017 published by FIDIC ("GCs"), as amended and/or added to by the following provisions.

2. [Details of amendments to the GCs, if any. For example:

   In the procedural rules annexed to the GCs, Rule _ is deleted and replaced by: " … "]

3. The DAAB Member shall be paid in accordance with Clause 9 of the GCs. The currency of payment shall be_____.

   In respect of Sub-Clauses 9.1 and 9.2 of the GCs, the amounts of the DAAB Member's monthly fee and daily fee shall be:

   monthly fee_____per month, and

   daily fee of_____per day

   (or as otherwise set under Sub-Clause 9.3 of the GCs).

4. In consideration of the above fees, and other payments to be made to the DAAB Member in accordance with the GCs, the DAAB Member undertakes to act as DAAB Member in accordance with the terms of this DAAB Agreement.

5. The Employer and the Contractor shall be jointly and severally liable for the DAAB Member's fees and other payments to be made to the DAAB Member in accordance with the GCs.

6. This DAAB Agreement shall be governed by the law of_____(if not stated, the law that governs the Contract under Sub-Clause 1.4 of the Conditions of Contract).

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DAAB-3

SIGNED by:_____	SIGNED by:_____	SIGNED by:_____
Print name:_____	Print name:_____	DAAB Member
Title:_____	Title:_____	Title:_____
for and on behalf of the Employer	for and on behalf of the Contractor	
in the presence of	in the presence of	in the presence of
Witness:_____	Witness:_____	Witness:_____
Name:_____	Name:_____	Name:_____
Address:_____	Address:_____	Address:_____
_____	_____	_____
Date:_____	Date:_____	Date:_____

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MG-1

FORM OF MOBILIZATION ADVANCE GUARANTEE/ BOND

Guarantee No._____Date _____

WHEREAS_____(hereinafter called the 'Employer')

has entered into a Contract for _____
(Particulars of Contract)
with_____(hereinafter called the "Contractor').

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Pak Rupees_____(PKR_____) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS, the Employer has asked the Contractor to furnish Guarantee to secure the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____

(hereinafter called the "Guarantor") at the request of the Contractor and in consideration of the Employer agreeing to make the above advance to the Contractor, has agreed to furnish the said Guarantee.

Not Used

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, on the part of the Contractor, of which the Employer at his discretion of making decision, shall be given by the Employer to the Guarantor, and on such first written demand, payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until_____whichever is earlier.
(Date)

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of PKR _____ (Pak Rupees _____ _____).

This Guarantee shall remain valid up to the aforesaid date and shall be null and void after the aforesaid date or earlier if the advance made to the Contractor is fully adjusted against payments from Interim Payment Certificates of the Contractor provided that the Guarantor

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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.

Not Used

Guarantor
(*Scheduled Bank*)

WITNESS: Signature _____

1. _____ Name _____

_____ Title _____

Corporate Secretary (Seal) Corporate Guarantor (Seal)

2. _____

_____

Name, Title & Address

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CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

The Conditions of Contract comprise two parts:

(a) General Conditions (GC)
(b) Particular Conditions (PC)

General Conditions (GC)

These Conditions are the "General Conditions" which form part of the "FIDIC Conditions of Contract for Construction for Building and Engineering Works Designed by the Employer Second Edition (2017 Red book, Reprinted 2022 with amendments)" published by:

International Federation of Consulting Engineers
(Fédération Internationale des Ingénieurs – Conseils) – (FIDIC)
World Trade Center II - Geneva Airport
P. O. Box 311
CH-1215 Geneva 15
Switzerland
Email: fidic@fidic.org, fidic.pub@fidic.org
Website: https://fidic.org/bookshop

The successful Bidder after award of Works shall have to provide two (02) copies of above said "General Conditions", free of cost for incorporation in the Contract.

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Particular Conditions (PC)

The Particular Conditions (PC) complement the General Conditions (GC) to specify dates, contractual requirements, and special circumstances related to the Works. The PC consists of twoparts, Part A - Contract Data and Part B - Special Provisions. The provisions to be found in the Special Provisions (Particular Conditions - Part B) take precedence over the equivalent provisionsfound under the same Sub-Clause number(s) in the General Conditions, and the provisions of the Contract Data (Particular Conditions - Part A) take precedence over the Special Provisions (Particular Conditions - Part B).

Part A - Contract Data

Sub-Clause	Data to be Given	Data
1.1.27	Defects Notification Period (DNP):	365 days
1.1.31	Employer's name and address:	Korangi Fisheries Harbour Authority (KoFHA) Chashma Goth, Rehri, District Malir, Karachi – Pakistan. Attention: Engr. Noor Ahmed Rind (Executive Engineer / Project Director)
1.1.35	Engineer's name and address:	National Engineering Services Pakistan (Pvt.) Ltd. 13th Floor, NICL Building, Abbasi Shaheed Road, Off Shahrah-e-Faisal, Karachi-74400, Pakistan. Attention: Syed Munawwar Abbas (GM/Head NESPAK, Karachi)
1.1.73	Sections:	Not Applicable.
1.1.84	Time for Completion:	Three Hundred & Sixty Five (365) calendar days [Twelve (12) calendar months] for whole of the Works.
1.3(a)(ii)	agreed methods of electronic transmission:	*[insert systems of electronic transmission, if any, at the time of signing of the Contract]* _____
1.3(d)	address of Employer for communications:	Korangi Fisheries Harbour Authority (KoFHA) Chashma Goth, Rehri, District Malir, Karachi - Pakistan

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Sub-Clause	Data to be Given	Data
		Attention: Engr. Noor Ahmed Rind (Executive Engineer / Project Director)
	address of Engineer for communications:	National Engineering Services Pakistan (Pvt.) Ltd. 13th Floor, NICL Building, Abbasi Shaheed Road, Off Shahrah-e-Faisal, Karachi-74400, Pakistan. Attention: Syed Munawwar Abbas (GM/Head NESPAK, Karachi)
	address of Contractor for communications:	*[To be added at the time of signing of the Contract.]*
1.4	Contract shall be governed by the law of:	Islamic Republic of Pakistan
	ruling language:	English
	language for communications:	English
1.8	number of additional paper copies of Contractor's Documents:	Two (02) copies.
2.1	after receiving the Letter of Acceptance, the Contractor shall be given right of access to all or part of the Site within:	Within 14 days from the date of receipt of Engineer's Notice to Commence which shall be issued within fourteen (14) days after signing of Contract Agreement.
2.4	Employer's financial arrangements	The Employer's own resources, loans or grants.
3.2 (e)(ii)	Engineer's Duties and Authority	Variation resulting in an increase of the Accepted Contract Amount in excess of one percent (1%) subject to accumulative Variations not exceeding five percent (5%) of the Accepted Contract Amount.

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Sub-Clause	Data to be Given	Data
4.2	Performance Security (as percentage of the Accepted Contract Amount in Currencies) percent:	• Ten percent (10%); and • Additional Performance Security if applicable under Clause IB. 30 of Instructions to Bidders as stated in the Letter of Acceptance. Note: 1) The Employer may require an additional Performance Security by 10% of the difference between the Accepted Contract Amount and the Engineer's estimate at the expense of the Contractor to a level sufficient to protect the Employer against financial loss in the event of default of the Contractor under the Contract. 2) The additional Performance Security shall be in the same form as the original Performance Security and shall be valid and enforceable until the date of issuance of the Taking-Over Certificate. 3) The additional Performance Security shall be returned to the Contractor no later than 28 days after the issuance of the Taking-Over Certificate.
	currency:	Denominated in the currency(ies) of the Contract or in a freely convertible currency acceptable to the Employer.
4.7.2	period for notification of error in the items of reference	Twenty Eight (28) days
4.19	period of payment for temporary utilities	Not applicable.
4.20	number of additional paper copies of progress reports	Three (03) copies.
5.1(a)	maximum allowable accumulated value of work subcontracted (as a percentage of the Accepted Contract Amount)	Ten percent (10%)

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Sub-Clause	Data to be Given	Data
5.1(b)	parts of the Works for which subcontracting is not permitted	None.
6.5	Normal working hours on the Site	Eight (08) hours per day
8.3	number of additional paper copies of programmes	Three (03) copies.
8.8	Delay Damages payable for each day of delay	0.1% of the Accepted Contract Amount for each day of delay in completion of the Works.
8.8	maximum amount of Delay Damages	Ten percent (10%) of the Accepted Contract Amount
8.14	Applicability of Incentives for Early Completion	No
12.3	Percentage profit	Ten percent (10%)
13.4.(b)(ii)	percentage rate to be applied to Provisional Sums for overhead charges and profit	Twenty five percent (25%)
14.2	total Advance Payment	Delete this Sub-Clause 14.2 in its entirety.
14.3	period of payment	One month
14.3(b)	number of additional paper copies of Statements	Three (03) copies.
14.3 (iii)	percentage of retention	Ten percent (10%)
14.3 (iii)	limit of Retention Money (as a percentage of the Accepted Contract Amount)	Five percent (5%)
14.5(b)(i)	Plant and Materials for payment when shipped	Not Applicable.
14.5(c)(i)	Plant and Materials for payment when delivered to the Site	As per the Employer's Recommendations.
14.6.2	minimum amount of Interim Payment Certificate (IPC)	2% of the Accepted Contract Amount for each IPCs.
14.7(a)	period of payment of Advance Payment to the Contractor	Delete this Sub-Clause 14.7(a) in its entirety.
14.7b(i)	period for the Employer to make interim payments to the Contractor under Sub-Clause 14.6 [Interim Payment]	45 days.

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Sub-Clause	Data to be Given	Data
14.7(c)	period for the Employer to make final payment to the Contractor	56 days
14.8	financing charges for delayed payment	Delete this Sub-Clause 14.8 in its entirety.
14.11.1(b)	number of additional paper copies of draft Final Statements	Six (06) copies.
14.15	currencies of payment of Contract Price	Pak Rupees only.
14.15(a)(i)	Proportions or amounts of Local and Foreign currencies	Not Applicable.
14.15(c)	currencies and proportions for payment of Delay Damages	Currency: Pak Rupees.
14.15(f)	rates of exchange	Not Applicable.
17.2(d)	forces of nature, the risks of which are allocated to the Contractor	Nil.
19.1	permitted deductible limits: i) insurance required for theWorks ii) insurance required for Goods iii) insurance required for liability for breach of professional duty iv) insurance required against liability for fitness for purpose (if any is required) v) insurance required for injury to persons and damage to property vi) insurance required for injury to employees vii) other insurances required by Laws and by local practice	 i) Ten percent (10%) of loss amount on each & every loss ii) Nil iii) Nil iv) Nil v) Nil vi) Nil vii) Nil.
19.1	Periods for submission of insurance: a) evidence of insurance b) relevant policies	a) Not later than the Commencement Date. b) Within twenty-eight (28) days from the Commencement Date.
19.2.1(b)	additional amount to be insured (as a percentage of the replacement value)	15% of the replacement value (Accepted Contract Amount).

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Sub-Clause	Data to be Given	Data
19.2.2	extent of insurance required for Goods amount of insurance required for Goods	from Ex-Works (i.e., works, factory, warehouse, etc) to delivery at the Site. Full replacement value.
19.2.3(a)	amount of insurance required for liability for breach of professional duty	Full replacement value of the Works to be designed by the Contractor.
19.2.3(b)	insurance required against liability for fitness for purpose	Yes.
19.2.3	period of insurance required for liability for breach of professional duty	Until the date of issuance of Performance Certificate.
19.2.4	amount of insurance required for injury to persons and damage to property	Injury to person and Fatal case: in accordance with Workmen Compensation Act. Damage to Property: Rs. 5,000,000/- incident without limit to the number of incidents.
19.2.6	other insurances required by Laws and by local practice	All insurances as applicable, to the extent of execution of the project, under Federal and Provincial laws of Islamic Republic of Pakistan
21.1	time for appointment of the DAAB	Within 28 days from the Commencement Date or whenever deemed appropriate after mutual agreement between the Employer & the Contractor.
21.1	the DAAB shall comprise	A sole Member.
21.1	List of proposed members of DAAB - proposed by Employer - proposed by Contractor	*[to be inserted at the time of signing of the Contract]* 1._____ 2._____ 3._____ 1._____ 2._____ 3._____
21.2	Appointing entity (official) for DAAB members	Chairman Pakistan Engineering Council (PEC) from the list of PEC approved arbitrators published at its website.

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Sub-Clause	Data to be Given	Data
21.6	Rules of Arbitration	PEC Rules of Conciliation and Arbitration or Arbitration Act, 1940, if the former is inactive. The place of Arbitration shall be: Karachi, Pakistan.

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Summary of Sections of the Works

Section Name/Description of parts of the Works that shall be designated a Section for the purposes of the Contract (Sub-Clause 1.1.73)	Value: Percentage* of Accepted Contract Amount (Sub-Clause 14.9)	Time for Completion (Sub-Clause 1.1.84)	Delay Damages (Sub-Clause 8.8)
A			
	NOT USED		

* These percentages shall also be applied to each half of the Retention Money under Sub-Clause 14.9.

Section Name/Description (Sub-Clause 1.1.73)	Time for Completion (Sub-Clause 1.1.84)	Incentives for Early Completion (Sub-Clause 8.14)
A		
	NOT USED	

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Particular Conditions
Part B - Special Provisions

1.2 Interpretation

"and" is deleted from the end of sub-paragraph (i) and added at the end of sub-paragraph (j).

Sub-paragraph (k) is added:

"(k) The word "tender" is synonymous with "bid" the word tenderer with "bidder", the words "tender documents" with "bidding documents" and "Schedule of Prices" with "Bill of Quantities", as applicable."

1.5 Priority of Documents

The documents listed at (a) through (k) of this Sub-Clause are deleted and substituted with the following:

(a) the Contract Agreement;
(b) the Letter of Acceptance;
(c) the Letter of Bid;
(d) the Particular Conditions Part A - Contract Data;
(e) the Particular Conditions Part B - Special Provisions;
(f) the General Conditions;
(g) the Specification;
(h) the Drawings;
(i) the completed Schedules to Bid including Bill of Quantities; and
(j) any other documents forming part of the Contract.

The addenda/corrigenda, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

1.6 Contract Agreement

In the last line of the 1st paragraph the text "the Employer" is substituted by "the Contractor".

3.1 The Engineer

In sub-paragraph (a) the text "as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)" are added after the words "professional engineer".

3.2 Engineer's Duties and Authority

The Engineer shall obtain the consent in writing of the Employer before taking action under the following Sub-Clauses of these Conditions:

(a) Consenting to the subcontracting of any part of the Works under Sub-Clause 5.1 [Subcontractors];

(b) Any action under Sub-Clauses 8.9 [Employer's Suspension]and 8.12 [Prolonged Suspension];

(c) Issuance of "Taking Over Certificate" under Sub-Clause 10.1 [Taking Over the Works and Sections];

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(d) Issuing the "Performance Certificate" under Sub-Clause 11.9 [Performance Certificate];

(e) Sub-Clause 13.1 [Right to Vary]: instructing a Variation, except;

i) in an emergency situation as determined by the Engineer, or

ii) if such a Variation would increase the Accepted Contract Amount by less than the percentage specified in the Contract Data.

(f) Sub-Clause 13.3 [Variation Procedure]: approving a proposal for Variation submitted by the Contractor in accordance with Sub-Clause 13.3.2 [Variation by Request for Proposal] or 13.2 [Value Engineering];

(g) Certifying release of second half of the Retention Money under Sub-Clause 14.9 [Release of Retention Money];

(h) Issuing Final Payment Certificate under Sub-Clause 14.13 [Issue of FPC].

Any such requirement shall not be applied to any action by the Engineer under Sub-Clause 3.7 [Agreement or Determination], as stated in Sub-Clause 3.2 [Engineer's Duties and Authority] of the General Conditions.

Notwithstanding the obligation, as set out above, to obtain approval, if, in the opinion of the Engineer, an emergency occurs affecting the safety of life or of the Works or of adjoining property, he may, without relieving the Contractor of any of his duties and responsibility under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply, despite the absence of approval of the Employer, with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 13 and shall notify the Contractor accordingly, with a copy to the Employer.

Following is added after the words "the Employer's consent is required" in 4th paragraph

"stating that the Employer's consent has been obtained for that specified authority".

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4.2 Performance Security

4.2.1 Contractor's Obligations

The entity issuing the Performance Security and its form shall be as under:

The Performance Security shall be, issued in the prescribed form included in the Bidding Documents, from Karachi based branch of any schedule bank in Pakistan with at least long term AAA PACRA/ VIS rating.

Following paragraph is added at the end of this Sub-Clause:

"The amount of Performance Security shall be reduced to 50% following issue of the Taking-Over Certificate for the whole of the Works under Clause 10 of Conditions of Contract."

4.3 Contractor's Representative

In second paragraph the text "professional engineer as defined in the Pakistan Engineering Council Act, 1975 (Act No. V of 1976) (having temporary licence in case of foreign engineer under Section 12 of the Pakistan Engineering Council Act, 1975 (Act No. V of 1976)" are added after the words "qualified, experienced".

In the 3rd paragraph the words "28 days" are substituted by "14 days". In 2nd line of 4th paragraph the text "or appoint a replacement" is substituted by "except appointment of a suitable temporary replacement is deployed at the Site".

4.4 Contractor's Documents

4.4.2 As-Built Records

First paragraph is deleted and the text in the last paragraph is substituted with the following:

"The Contractor shall furnish to the Engineer six (06) copies, one reproducible and one electronic copy (editable Auto CAD dwg format) (provided the Engineer has made available to the Contractor editable form of the Drawings) of all Drawings amended to conform to the Works as built. In case the Engineer does not make available to the Contractor editable form of the Drawings, the Contractor shall furnish to the Engineer as-built data for incorporation in the Drawings. Upon receipt of PDF versions of the as-built drawings prepared by the Engineer, the Contractor shall furnish to the Engineer six (06) copies and one reproducible of these Drawings.

The price of such Drawings shall be deemed to be included in the Contract Price."

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Following Sub-Clause is added:

4.4.4 Shop Drawings

The Contractor shall submit to the Engineer for review three (03) hard copies and one (01) electronic copy (editable Auto CAD dwg format) of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract.

Review and approval by the Engineer shall not exceed 21 days and be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory and the Engineer's review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

4.8 Health and Safety Obligations

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

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

4.20 Progress Report

At the end of sub-paragraph (g) the word "and" is deleted and at the end of sub-paragraph (h) the full stop (.) is replaced with ";", and the following new sub-paragraphs are added as:

(i) planned programme for the execution of the Works for next 56 days to enable the Engineer to determine its programme of inspection and testing;

(j) monthly summery of daily job record indicating weather conditions, deployment of Contractor's Equipment, labour employment, local material procurement and material import, if any; and

(k) salient contractual and project information.

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5.1 Subcontractors

Add the following text at the end of paragraph (ii):

"under Schedule to Bid"

The following is added at the end of the last paragraph of Sub-Clause 5.1:

"All subcontracts relating to the Works shall include provisions which entitle the Employer to require the subcontract to be assigned to the Employer under sub-paragraph (a) of Sub-Clause 15.2.3 [*After Termination*].

The Contractor shall give reasonable opportunity to contractors from Islamic Republic of Pakistan for subcontracts for the Works, and endeavour to employ such contractors as Subcontractors."

5.2 Nominated Subcontractors

5.2.2 Objection to Nomination

In sub-paragraph (c), "and" is deleted from the end of (i); "." at the end of (ii) is replaced with: ", and".

The following is then added as (iii):

"(iii) be paid only if and when the Contractor has received from the Employer payments for sums due under the Subcontract referred to under Sub-Clause 5.2.3 [*Payment to nominated Subcontractors*]."

6.1 Engagement of Staff and Labour

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

"The Contractor shall, to the extent practicable and reasonable, employ staff (not less than 50%) and labour (not less than 85%) with appropriate qualifications and experience from sources within the Islamic Republic of Pakistan."

6.7 Health and Safety of Personnel

The existing text is substituted with the following:

"In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorize or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose. The Contractor shall also provide all other medical services and appoint a health and safety officer at Site if stated in the Specifications. In case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means."

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6.8 Contractor's Superintendence

Insert at the end of sub-paragraph (a) of this Sub-Clause:

"or, if not, the Contractor shall make competent interpreters available during all working hours, in a number sufficient for those persons to properly perform their superintendence duties"

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

"The Contractor's authorized representative and his other engineers working at site shall possess valid registration with the Pakistan Engineering Council.

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

6.12 Key Personnel

The following is inserted at the end of the last paragraph:

"If any of the Key Personnel are not fluent in this language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer."

The following Sub-Clauses 6.13 to 6.26 are added at the end of Sub-Clause 6.12:

6.13 Foreign Personnel

The Contractor may bring in to the Country any foreign personnel who are necessary for the execution of the Works to the extent allowed by the applicable Laws. The Contractor shall ensure that these personnel are provided with the required residence visas and work permits. The Employer will, if requested by the Contractor, use all reasonable endeavours in a timely and expeditious manner to assist the Contractor in obtaining any local, state, national, or government permission required for bringing in the Contractor's personnel.

The Contractor shall be responsible for the safety and security in the Country as well as the return of these personnel to the place from where they were recruited or to their domicile. In the event of the death in the Country of any of these personnel or members of their families, the Contractor shall similarly be responsible for making the appropriate arrangements for their return or burial.

6.14 Supply of Foodstuffs

The Contractor shall arrange for the provision of a sufficient supply of suitable food as may be stated in the Specification at reasonable prices for the Contractor's Personnel for the purposes of or in connection with the Contract

6.15 Supply of Water

The Contractor shall, having regard to local conditions, provide on the Site an adequate supply of drinking and other water for the use of the Contractor's Personnel.

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6.16	**Measures against Insect and Pest Nuisance**	The Contractor shall at all times take the necessary precautions to protect the Contractor's Personnel employed on the Site from insect and pest nuisance, and to reduce the danger to their health. The Contractor shall comply with all the regulations of the local health authorities, including use of appropriate insecticide.
6.17	**Alcoholic Liquor or Drugs**	The Contractor shall not, otherwise than in accordance with the Laws of the Country, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or allow importation, sale, gift, barter or disposal thereto by Contractor's Personnel.
6.18	**Arms and Ammunition**	The Contractor shall not give, barter, or otherwise dispose of, to any person, any arms or ammunition of any kind, or allow Contractor's Personnel to do so.
6.19	**Festivals and Religious Customs**	The Contractor shall respect the Country's recognized festivals, days of rest and religious or other customs.
6.20	**Funeral Arrangements**	The Contractor shall be responsible, to the extent required by local regulations, for making any funeral arrangements for any of its local employees who may die while engaged upon the Works.
6.21	**Forced Labour**	The Contractor, including its Subcontractors, shall not employ or engage forced labour which consists of any work or service, not voluntarily performed, that is exacted from an individual under threat of force or penalty, and includes any kind of involuntary or compulsory labour, such as indentured labour, bonded labour or similar labour-contracting arrangements.
6.22	**Child Labour**	The Contractor, including its Subcontractors, shall not employ or engage child labour in accordance with relevant law(s) in force in Islamic Republic of Pakistan.
6.23	**Employment Records of Workers**	The Contractor shall keep complete and accurate records of the employment of labour at the Site. The records shall include the names, ages, genders, hours worked and wages paid to all workers. These records shall be summarized on a monthly basis and submitted to the Engineer. These records shall be included in the details to be submitted by the Contractor under Sub-Clause 6.10 [*Contractor's Records*].
6.24	**Workers' Organizations**	The Contractor shall comply with the relevant labour laws of Pakistan which recognize workers' rights to form and to join workers' organizations/Trade Union of their choosing and to bargain collectively without interference.

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6.25 Non-Discrimination and Equal Opportunity

The Contractor shall not make decisions relating to the employment or treatment of Contractor's Personnel on the basis of personal characteristics unrelated to inherent job requirements. The Contractor shall base the employment of Contractor's Personnel on the principle of equal opportunity and fair treatment, and shall not discriminate with respect to any aspects of the employment relationship, including recruitment and hiring, compensation (including wages and benefits), working conditions and terms of employment, access to training, job assignment, promotion, termination of employment or retirement, and disciplinary practices.

Special measures of protection or assistance to remedy past discrimination or selection for a particular job based on the inherent requirements of the job shall not be deemed discrimination. The Contractor shall provide protection and assistance as necessary to ensure non-discrimination and equal opportunity, including for specific groups such as women, persons with disabilities, migrant workers and children (of working age in accordance with Sub-Clause 6.22).

6.26 Epidemics

In the event of any out-break of illness of epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government or the local medical or sanitary authorities for the purpose of overcoming the same.

7.7 Ownership of Plant and Materials

The following is added before the first paragraph:

"Except as otherwise provided in the Contract,"

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

"No Plant and/or Materials that is the property of the Employer shall be removed from the Site. If it becomes necessary to:

i) remove any item of such Plant from the Site for the purposes of repair, the Contractor shall give a Notice, with reasons, to the Engineer requesting consent to remove the defective or damaged item off the Site. This Notice shall clearly identify the item of defective or damaged Plant, and shall give details of: the defect or damage to be repaired; the place to which defective or damaged item of Plant is to be taken for repair; the transportation to be used (and insurance cover for such transportation); the proposed inspections and testing off the Site; and the planned duration required before the repaired item of Plant shall be returned to the Site. The Contractor shall also provide any further details that the Employer may reasonably require; or

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ii) replace any item(s) of such Plant and/or Materials, the Contractor shall give a Notice, with reasons, to the Engineer clearly identifying the item(s) of Plant and/or Materials to be replaced, and giving details of the due date of delivery to the Site of the replacement item(s).

Where any item of Plant and/or Materials has become the property of the Employer under this Sub-Clause before it has been delivered to the Site, the Contractor shall ensure that such an item is not moved except for its delivery to the Site.

The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any defect in title or encumbrance or charge (except any reasonable restriction arising from the intellectual property rights of the manufacturer or producer) on any item of Plant and/or Materials that has become the property of the Employer under this Sub-Clause."

The following Sub-Clause 7.9 is added after Sub-Clause 7.8:

7.9 Use of Pakistani Materials and Services

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

8.1 Commencement of Works

The following is added before the first paragraph:

"After signing of the Contract Agreement by both Parties," and thereafter the word "The" is replaced with the word "the".

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8.3 Programme

Add the following at the end of this Sub-Clause:

The Contractor shall submit the programme as per following:

(a) The Contractor shall submit the Programme of Works on Primavera P6 for the approval of the Engineer. All items of works and activities including mobilization should be included in the Programme of Works. The programme shall identify and highlight those activities, which are on the Critical Path. The programme shall be revised monthly and should include a chart of principal activities of the work forecast for monthly execution and an updated schedule of the payment to be made by the Employer to the Contractor. This Programme of Works shall form basis of Delay Damages pursuant to Sub-Clauses 8.8. In addition, cash flow estimates shall be supported with inputs of over drafts organized with financial institutions at various stages of the projects to meet the funding requirements of the project. The Contractor shall supply and maintain for his use and separately for the Engineer use a licensed copy of the project management computer software package namely Primavera P6 as used by the Contractor for programming, to monitor the progress. It shall be supplied complete with manuals and technical training and support for the duration of the Contract as per requirements assessed by the Engineer.

(b) In order to assist the Employer/ Engineer, the Contractor shall be required to submit data at two weeks intervals to the Engineer on the cost and quantities and other data relevant to the monitoring of progress according to a format suitable for computer processing.

(c) The programme should be computerized and drawn up on the CPM, identifying all items of work including temporary work. Progress reporting by the Contractor should be supported on a monthly basis with an up-to-date analysis of the progress including a statement on items, which are or are about to become critical to the progress of the work along with the proposals on how the Contractor intends to alleviate the situation.

8.5 Extension of Time for Completion

The following is added after paragraph (c):

“for last five years”.

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The following Sub-Clause 11.12 is added after Sub-Clause 11.11:

11.12 Supervisory Assistance During DNP

If provided under the Schedule of Prices, the Contractor shall provide supervisory assistance to the Employer during the DNP for the Works. Such supervisory assistance shall be as described in the Specification for the purpose of supporting the Employer's operation and maintenance of the Plant for the period specified in the Schedule of Prices after the Date of Completion.

12.2 Method of Measurement

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

"Summary of measured quantity for payment shall be delineated item-wise under four heads namely; "Schedule of Prices Quantity", "Quantity Executed To-date", "Quantity Certified Previously" and "Net Quantity Executed under this Certificate".

12.3 Valuation of the Works

The following text is added at the end of fifth paragraph of the Sub-Clause:

"Sum of overhead charges and profit for sub-paragraph (a) shall be Twenty Five percent (25%)".

13.4 Provisional Sums

The following paragraph is inserted as the penultimate paragraph:

"The Provisional Sum shall be used to cover the Employer's share of the DAAB members' fees and expenses, in accordance with Clause 21. No prior instruction of the Engineer shall be required with respect to the work of the DAAB. The Contractor shall submit the DAAB members' invoices and the satisfactory evidence of having paid 100% of such invoices as part of the substantiation of those Statements submitted under Sub-Clause 14.3.

13.6 Adjustments for Changes in Laws

The following paragraphs are added at the end of the Sub-Clause:

"Notwithstanding the foregoing, the Contractor shall not be entitled to an extension of time if the relevant delay has already been taken into account in the determination of a previous extension of time and such Cost shall not be separately paid if the same shall already have been taken into account in the indexing of any inputs to the Table of Adjustment Data in accordance with the provisions of Sub-Clause 13.7 [*Adjustments for Changes in Cost*].

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Notwithstanding the provisions of this Sub-Clause, any adjustments to the Contract Price shall exclude any changes in the rates of income tax applicable to the Contractor, the Contractor's personnel, or the Contractor's subcontractors.

The Contractor shall be deemed to have taken into account all risks related to income tax in its quoted rates, including the possibility of increases or decreases in income tax rates during the execution of the Works.

Any such changes in income tax rates shall not constitute grounds for an adjustment to the Contract Price, an extension of time, or any other claim under this Contract."

14.2 Advance Payment This Sub-Clause 14.2 is deleted in its entirety.

14.8 Delayed Payment This Sub-Clause 14.8 is deleted in its entirety.

The following Sub-Clause 14.16 is added after Sub-Clause 14.15:

14.16 Adjustment for Seriously Unbalanced Bid (Front Loaded)

In the event that the Contractor's Bid was found to be seriously unbalanced (Front Loaded) during evaluation in relation to the average of other evaluated substantially responsive bids, the Employer during execution of the Contract shall pay against measured quantities of significantly higher quoted line item(s) rate(s) with respect to same line item(s) rate(s) determined from the average of other lowest two evaluated substantially responsive bids as instructed by the Engineer. The balance line item(s) rate(s) shall be paid against the same measured quantities at the time of issuance of Taking-Over Certificate.

The list of significantly higher quoted line item(s) rate(s) is stated in the Letter of Acceptance.

15.2 Termination for Contractor's Default

<u>15.2.1 Notice</u>

Following text is added at the end of sub-paragraph (h) of this Sub-Clause:

"For the purposes of this Contract, corrupt and fraudulent practices have been defined in Public Procurement Rules 2004."

<u>15.2.3 After Termination</u>

The word "and" at the end of sub-paragraph (ii) of paragraph (b) is deleted the following paragraph is added after sub-paragraph (iii):

"(iv) all Employer-Supplied Materials and/or Employer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 [*Employer-Supplied Materials and Employer's Equipment*], and"

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15.4 Payment after Termination

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

"The Employer shall be entitled to sell any of the Contractor's Equipment, Temporary Works and unused materials and apply the proceeds of sale towards payment of any debt due from the Contractor to the Employer under this Clause including any outstanding payments to the Subcontractors."

16.2 Termination by Contractor

16.2.1 Notice

The sub-paragraph (j) is deleted in its entirety.

At the end of sub-paragraph (i) "; or" is replaced with "." and at the end of sub-paragraph (h) ";" is replaced with "; or".

In sub-paragraph (f) "84 days" are replaced with "180 days" and text "for reasons not attributable to the Contractor" is added at the end.

16.3 Contractor's Obligations After Termination

Sub-paragraph (c) is deleted and replaced with:

"(c) deliver to the Engineer all Employer-Supplied Materials and/or Employer's Equipment made available to the Contractor in accordance with Sub-Clause 2.6 [*Employer-Supplied Materials and Employer's Equipment*]; and

(d) remove all other Goods from the Site, except as necessary for safety, and leave the Site."

17.1 Responsibility for Care of the Works

After the two instances of "Goods" in the last paragraph, the words "Employer-Supplied Materials and/or Employer's Equipment" are added.

The following Sub-Clause 17.7 is added after Sub-Clause 17.6:

17.7 Use of Employer's Accommodation/ Facilities

The Contractor shall take full responsibility for the care of the items of the Employer's facilities and/or accommodation, if any, as detailed in the Specification, from the date of use and/or occupation by the Contractor until the date on which such use and/or occupation is re-vested in the Employer.

If any loss or damage happens to any of the above items during a time while the Contractor is responsible for its care, arising from any cause other than a cause for which the Employer is responsible or liable, the Contractor shall promptly rectify the loss or damage at the Contractor's risk and cost.

18.1 Exceptional Events

The words "or disorder" are replaced with "disorder or sabotage" in sub-paragraph (c) of the Clause.

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18.4 Consequences of an Exceptional Event

The following is added at the end of sub-paragraph (b) after deleting the ".":

", including the costs of rectifying or replacing the Works and/or Goods damaged or destroyed by Exceptional Events, to the extent they are not indemnified through the insurance policy referred to in Sub-Clause 19.2 [*Insurance to be provided by the Contractor*]."

18.5 Optional Termination

In sub-paragraph (c), the words "and necessarily" are added after the words "was reasonably".

19.1 General Requirements

Following text is added at the end of first paragraph:

"The Contractor shall immediately after the date of the Letter of Acceptance submit the draft of insurance policies for the Employer's consent."

Following text is added at the end of third paragraph:

"The Contractor shall, within the respective periods stated in the Contract Data submit to the Engineer and the Employer a) evidence that the insurances described in this Clause have been effected, and b) copies of policies of the insurances described in Sub-Clauses 19.2.1, 19.2.4 and 19.2.5."

19.2 Insurance to be provided by the Contractor

<u>19.2.5 Injury to employees</u>

The words "sickness, disease" are deleted in the third line of first paragraph.

The following Sub-Clause is added after Sub-Clause 19.2.6:

<u>19.2.7 Insurance Company</u>

"The Contractor shall be obliged to place all insurances described in this Clause with insurers rated by PACRA/VIS of AA+ rating or above, acceptable to the Employer.

Costs of such insurances shall be borne by the Contractor."

21.6 Arbitration

The word "international" is deleted in the sixth line of first paragraph. The text of sub-paragraph (a) is substituted with the following:

"the Dispute shall be finally settled under the Rules of Arbitration, specified in the Contract Data;"

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The following Clauses are added after Clause 21:

22 Custom Duty

The rates and prices stated in the priced Bill of Quantities shall be deemed to include every element of duties leviable on or in relation to the production, import, purchase, sale, delivery and transportation of materials and to the bringing thereof to the Site and no such duties shall be separately reimbursable.

23 Taxes

The Contractor, Subcontractors and their employees shall be liable to pay income tax, withholding tax, super tax and other taxes on income arising out of the Contract. The rates and prices as stated in the Contract shall be deemed to cover all such taxes except for Sindh Sales Tax on Construction Services.

24 Integrity Part

If it is found and established at any stage that the Contractor or any of his Subcontractors, agents or servants have violated or involved in violation of the Integrity Pact signed by the Contractor then the Employer shall be entitled to:

(a) recover from the Contractor an amount equivalent to ten times the sum of any commission, gratification, bribe, finder's fee or kickback given by the Contractor or any of his Subcontractors, agent or servants.

(b) terminate the Contract; and

(c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his Subcontractors, agent or servants.

The termination under sub-paragraph (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clause 15.1 to 15.4 and the payment under Sub-Clause 15.4 shall be made after having deducted the amounts due to the Employer under sub- paragraph (a) and (c) of this Sub-Clause.

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SPECIFICATIONS

(Refer Volume-III of the Bidding Documents)

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DRAWINGS
(Refer Volume-IV of the Bidding Documents)

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KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DOCUMENTS

VOLUME-III

SPECIFICATIONS
CIVIL WORKS

July, 2026

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PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

VOLUME – III
SPECIFICATIONS

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PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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SECTION - 0100

GENERAL REQUIREMENTS

01 GENERAL

The Conditions of Contract Part I & II shall form an integral part of these General Requirements.

The Contractor shall notify all sub-contractors of the provisions of the Conditions of Contract and the General Requirement of this Specification.

The arrangement and divisions of these Specifications is not to be construed as establishing the limits of responsibility of sub-trades.

The Contractor is responsible for delineating the scope of Sub-Contracts and for coordinating all the Works.

All works shall be carried out in accordance with the following specifications, supplemented by detailed specifications contained in the following sections. Any inconsistencies or ambiguities shall be brought to the notice of the Engineer for his clarification/decision. Decision and direction of the Engineer, in all such cases, shall be final and binding.

The Contractor shall make himself thoroughly familiar with the site conditions, foresee any and all problems likely to be encountered during execution of the works, and shall be able and ready to solve them effectively. Proposals for solutions to the problems shall be submitted to the Engineer for approval before proceeding with the work.

02 APPLICABLE CODES AND STANDARDS

In the absence of other Standards being required by the Contract Documents, all work and materials shall meet the requirement of the Uniform Building Code of the United States, and/or applicable American Society for Testing Materials (ASTM),American Association of State Highway and Transportation Officials (AASHTO) Specifications and the latest American Concrete Institute Manual of Concrete Practice and American Institute of Steel Construction (AISC) Manual relevant to the Works except in cases where the Pakistan Building Code requires a higher standard. In such cases the Pakistani Code shall govern. Where the abbreviations listed below are used, it refers to the latest code, standards, or publication of the following organizations:

AASHTO	American Association of State Highway and Transportation Officials.
ACI	American Concrete Institute
AISC	American Institute of Steel Construction
ANSI	American National Standards Institute
ASA	American Standard Association
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Material
AWS	American Welding Society
BSI	British Standards Institute
BSICP	British Standard Institute Code of Practice
PCA	Portland Cement Association
PSI	Pakistan Standard Institute
PSQCA	Pakistan Standard & Quality Control Authority.
UBC	Uniform Building Code
UPS	Uniform Plumbing Code
NFPA	National Fire Protection Association
BCP	Building code of Pakistan

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If the Contractor, at any time and for any specific reasons, wish to deviate from the above standards or desires to use materials or equipment other than those provided for by the above standards, then he shall state the exact nature of the change giving the reasons for making the change and shall submit complete specifications of the materials and descriptions of the equipment for the Engineer's approval, whose decisions shall be conclusive and binding upon the Contractor.

03 CODES, STANDARDS, CERTIFICATES

The Contractor shall supply and have at his site office:

Copies of all latest editions of codes and standards referred to in these specifications by number, or equivalent codes and standards approved by the Engineer.

Catalogues and published recommendations from manufacturers supplying products and materials for the project.

The Contractor shall provide manufacturer's or supplier's certificates to the Engineer for all products and materials which must meet the requirements of a specific code or standard as stated in these Specifications.

04 UNITS OF MEASUREMENTS

The International System of Units (SI) shall be used throughout this Project.

05 MANUFACTURER'S RECOMMENDATIONS

Installation, testing & commission of manufactured items shall be in accordance with procedures recommended by the manufacturer or as approved by the Engineer.

06 EXISTING CONDITION AT SITE

Drawings and information pertaining to existing project conditions are available at the Employer’s office for reference.

Neither the Employer nor the Engineer warrants the adequacy or correctness of these information.

07 PROTECTION AND PRECAUTIONS

The Contractor and his sub-contractors shall afford all necessary protection to existing structures and will be required to make good at his own expense any damage done to such structures through his own or his representatives or subcontractors' fault and negligence.

The Contractor and his sub-contractors shall afford all necessary protection to existing roads in the area. He will clear and make good at his own expense any damage to or debris on these roads through his own fault and negligence. He must at all time ensure the free and normal flow of traffic and shall not cause obstruction to the traffic system. The Contractor and his sub-contractors shall provide and maintain necessary protection and precautionary measures such as warning signs, warning lamps and barricades etc. to prevent accidents.

The Contractor shall promptly correct all such damage to original condition at no additional expense to the Employer.

The Contractor shall cooperate with other Contractors performing work under other Contracts as necessary for completion.

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08 SETTING OUT OF WORK

8.1 Verify accuracy of layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.

(a) Do not change or relocate benchmarks or control points without prior written approval from the Engineer. Promptly report lost or destroyed reference points or requirements to relocate reference points because of necessary changes in grade, location or conflicting construction.

(b) Promptly replace lost or damaged project control points with prior approval of the Engineer. Replacement of project control points shall be based on original survey control points.

(c) Establish and maintain the required number of permanent benchmarks on the job site as directed by the Engineer. Benchmarks shall be located from and referenced to data established from survey control points. Record benchmark location, with horizontal and vertical data, on Project Record Documents.

8.2 Existing utilities and equipment:

(a) The existence and location of underground and other utilities and construction indicated in the Construction Documents as existing are not guaranteed. Before beginning site work, investigate and verify the existence and location of underground utilities and other construction and record this information on the relevant plan.

(b) Prior to construction, verify the location and invert elevation at points of connection to sanitary sewer, storm drainage and water service piping. Verify the location of electrical power and communication utilities for interface.

8.3 PERFORMANCE

(a) Working from lines and levels established by the property survey, establish benchmarks and reference markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Drawings shall not be scaled to determine dimensions.

(b) Maintain a Surveyor's Log of control and other survey work. Surveyor's Log shall be made available for The Engineer reference.

Record deviations from required lines and levels, and advise the Engineer when deviations that exceed indicated or recognized tolerances are detected. Contractor shall record on Project Record Drawings deviations that are accepted and not corrected.

8.4 Site Works:

(a) Locate and lay out works, fill and topsoil placement, slopes and invert elevations by instrumentation and similar appropriate means.

(b) Prior to Substantial Completion, prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the Surveyor, to the effect that principal metes, bounds, lines and levels of Project are accurately positioned as shown on survey.

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09 SEQUENCE OF CONSTRUCTION

The Contractor shall submit his proposal for approval of the Engineer the sequence of Construction, prior to starting the works. The works shall be executed as per approved sequence of construction.

10 PARTIAL POSSESSIONS

Whenever, as determined by the Employer any portion of work performed by the Contractor is in a condition suitable for use, the Employer may take possession of or use such portion.

Such use by the Employer shall in no instance be construed as constituting final acceptance, and shall neither relieve the Contractor of any of his responsibilities under the Contract, nor acts a waiver by the Employer of any of the conditions thereof, provided that the Contractor shall not be liable for the cost of repairs, re-work, or renewals which may be required due to ordinary wear and tear resulting from such use. However, if such use increases the cost or delays to the completion of remaining portions of work, the Contractor will be entitled to an equitable adjustment.

If, as a result of the Contractor's failure to comply with the provision of the Contract, such use proves to be unsatisfactory, the Employer will have the right to continue such use until such portion of the work can, without injury to the Employer, be taken out of service for correction of defects, errors, omissions, or replacement of unsatisfactory materials or equipment, as necessary for such work to comply with the Contract; provided that the period of such operation or use pending completion of appropriate remedial action shall not exceed twelve months unless otherwise mutually agreed upon in writing between the parties.

11 EXISTING SERVICES

The Contractor shall search for, find, locate and protect any wiring, cable, duct, pipework, etc., within or immediately adjoining the site area.

The Contractor shall take full responsibly for safety of existing service lines, utilities and utility structures uncovered or encountered during excavation and construction operations.

The Contractor shall take full responsibility for damaging any such service lines, utility/utility structure and any cost and/or expense that arises or issues from any such damage shall be borne directly by him. If damage to any such service occur the Contractor shall forthwith take remedial action, initiate safety precautions, install temporary services and carryout repair all at his own cost and expense and inform the Engineer and notify all relevant authorities.

Existing utilities which are to remain in service for or after the works are to be determined by the Contractor. If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered during these operations, they shall be safeguarded, protected from damage, and supported. Temporary relocation of any services shall be the responsibility of the Contractor and such work shall be carried out after obtaining approval from the Engineer.

12 PLANT AND EQUIPMENT

The Contractor shall submit a detailed list of plant and equipment which he shall undertake to bring to the site to carry out the work. The list shall satisfy the Engineer as to type, size and quantity. The list shall include for each piece of equipment the type, manufacturer, model, identification number and year of manufacture. The Contractor shall provide on the site of the work at his cost all of the equipment listed and all subsequent equipment required for approval of the detailed programme of work and such equipment which may be directed by 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.

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13 CONSTRUCTION AREA AND ACCESS

The Contractor shall confine his operations to the areas that are actually required for the Works and shall fence the area accordingly. Arrangements for access roads, storage areas and routes for haulage of materials are to be made by the Contractor at his own cost, subject to the approval of the Engineer.

Handing over the entire area may not be possible and the Contractor shall take it into account while quoting the rates and prices.

Arranging the security clearance from the relevant agencies shall be the responsibility of the Contractor.

14 STORAGE & HANDLING FACILITIES

The Employer will provide the Contractor possible space within or nearby the area of site of works for the storage of plant, equipment and materials and for Contractor's temporary office, during the currency of the Contract. In case the adjacent area as required by the Contractor is not available within the Project boundary for storage of plant, equipment and machines then the Contractor shall arrange at his own expense possible space for storage of plant, equipment and machines at his own cost and expense. On no account shall such temporary installations conflict/interfere with any of the permanent installations, services and any operational function of Employer. The handling and storage of all plants, equipment and materials at site shall be the sole responsibility of the Contractor and at no risk and cost to the Employer.

The Contractor shall protect all material against corrosion, mechanical damage or deterioration during storage and erection on site. The protection methods shall be to the approval of the Engineer.

15 TEST LABORATORY AND TESTING

15.1 Testing, except as otherwise specified herein, shall be performed by an approved testing agency as proposed by the Contractor and at no extra cost to the Employer. The Engineer may require all testing to be carried out under his supervision only.

15.2 If suitable and adequate material testing laboratory is not available in the vicinity, then the Contractor shall provide and maintain a materials testing laboratory in the vicinity of the Contractor's Camp and the laboratory shall have sufficient working area and shall be equipped with all necessary facilities including a suitable store room.

15.3 The Contractor shall supply and maintain to the satisfaction of the Engineer or his representative complete testing equipment, apparatus, tools, gauges, instruments, etc. in sufficient number and adequate for all tests to be carried out as specified in these specifications. Valid calibration certificates of gauges / instruments / equipment shall be provided by the Contractor.

15.4 The Contractor, after the approval by the Engineer for the source of cement and steel shall make available at the site sufficient stock of the materials in advance in order to allow sample testing for quality control prior to use.

15.5 The quality control testing shall be performed by the Contractor's competent personnel in accordance with a site testing and quality control programme to be established by the Contractor and approved by the Engineer or his Representative. The Contractor shall keep a complete record of all quality tests performed on site and submit the same to the Engineer. All quality control and related tests shall be carried out in accordance with applicable standards and codes.

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16 CONSTRUCTION & CHECKING AT SITE

The Contractor shall submit to the Engineer in due time for approval and discussion, his proposals and plans as to the method and procedure to be adopted for the temporary and permanent works involved.

The submitting to these suggestions and arrangements, and the approval thereof by the Engineer shall not relieve the Contractor of his responsibilities and duties under the Contract.

The carrying out of all work included in the Contract is to be supervised by a sufficient number of qualified representatives of the Contractor and full facilities and assistance are to be afforded by the Contractor for the Engineer or his Representative to check & examine the execution of the work.

The Engineer reserves the right to inspect all parts of the works but may at his discretion waive inspection on certain items. This shall in no way absolve the Contractor from his responsibilities. This particularly applies to the checking of materials, the accurate setting out of foundations, and to the levelling, setting and aligning of the various parts, and to the proper fitting and adjustment of manufactured and finished materials and fixtures in position.

If the Engineer or his Representative find that the work progress is slow in such a way that the works or parts thereof will not be completed in the time specified, then he shall order the Contractor to work overtime or in shifts and the Contractor shall comply. These arrangements will be free of all financial encumbrances and at no additional costs to the Employer.

In the event of night work, the Contractor shall provide sufficient and adequate lighting to the satisfaction of the Engineer or his Representative and shall supply the necessary manpower for satisfactory continuation of the work after normal hours.

17 BAR BENDING SCHEDULE

Bar bending (reinforcement bars) schedule of all drawings shall be prepared by the Contractor and submitted in triplicate to the Engineer for approval.

18 DRAWINGS

18.1 Procurement Drawings: Drawings are provided in Volume-4 and are referred as Procurement Drawings. The Drawings show the scope of work and general scheme of repair work to be performed by the Contractor. Procurement Drawings shall not be used as a basis for fabrication or construction but may be used as a basis for placing preliminary order for materials. Procurement Drawings are subject to be modified and supplemented by additional detail by the Engineer.

18.2 Shop Drawings: The Contractor shall prepare shop drawings based on their own assessment and quantification of works - and submit the methodology of all the repair works along with shop drawings to the Engineer for his review and approval. The Contractor may carryout any field & laboratory tests and investigations, if deemed necessary, for preparation of the shop drawings.

. The work shall be executed in conformity with the approved shop drawings. The Contractor shall prepare a schedule of the Works based on Construction programme approved by the Engineer.

18.3 Study of As-Built and Bidding Drawings: The Contractor shall study all Bidding Drawings Issued by the Consultants and all the As-Built Drawings provided by the Employer before devising and testing scheme and preparing their shop drawings.

18.4 Copies of Drawing: Drawings will be issued to the Contractor free of charge as follows:

18.5 Drawings to be furnished by the Contractor:

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(a) Shop Drawings.

Shop drawings required for the dismantling & repair works and all works including all kinds of fabrication, field erection, installation, placement and layout drawings shall be furnished by the Contractor for approval of the Engineer. If additional detail drawings are necessary to complete any part of the work, such as additional reinforcing steel, drawings shall be prepared by the Contractor and submitted to the Engineer for approval. All drawings shall be complete and shall be submitted in due time and in logical order to facilitate proper coordination and approval of the Engineer.

(b) Lift and placement Drawings.

At least thirty calendar days prior to starting construction of any concrete lift or other placement, the Contractor shall submit lift or other placement drawings to the Engineer for approval. Lift or other placement and drawings shall be submitted for each lift or other placement of concrete to be placed. These drawings shall be to such scale as to clearly show all recesses, openings, and embedded parts, including embedded structural steel, mechanical and electrical items, reinforcement placement in each lift in sufficient detail for proper execution of the work.

(c) Construction Plant Layout Drawings.

Three prints of drawings, showing the layout of construction plant and equipment the Contractor proposes to use on the work, shall be submitted by the Contractor for review to the Engineer. The drawings shall show the locations of the principal components of the construction plant, offices; storage areas and yards which the Contractor proposes to construct or use at the site of the work and elsewhere. The drawings shall also show the unloading facilities for materials and equipment at the work site.

18.6 Submissions and Approvals:

(a) Except as otherwise specified, three copies of each drawing for approval or review shall be furnished to the Engineer. Within thirty calendar days after receipt, the Engineer will send one copy to the Contractor marked Approved, Approved/Except as Noted, or Returned for Correction. The notations Approved and Approved/Except as Noted will authorize the Contractor to proceed with the fabrication of the materials and equipment covered by such drawings subject to the corrections, if any, indicated thereon. Drawings returned for correction will be resubmitted for approval in the same manner as for new drawings. Every revision made during the life of the Contract shall be shown by number, date and subject in a revision block.

(b) Upon receipt of prints which have been Approved or Approved Except as Noted, the Contractor shall furnish three prints plus one reproducible of each drawing to the Engineer. If revisions are made after a drawing has been approved, the Contractor shall furnish three (03) additional prints and one (01) reproducible subsequent to each approved revision.

(c) Shop drawings to be prepared by a Sub-contractor shall be submitted in the same manner as (a) & (b) above but they will be submitted through the Contractor.

(d) All of the applicable requirements of this Clause with reference to drawings to be prepared by the Contractor, including Sub-contractors, shall apply equally to catalogue cuts, illustrations, printed specifications, or other data submitted for approval.

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(e) Any work done on Contractor's drawings shall beat the Contractor's risk. The Engineer will have the right to request any additional details and to require the Contractor to make any changes in the drawings which are necessary to conform to the provisions and intent of design and specifications without additional cost to the Employer. The approval of the drawings by the Engineer shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Approval by the Engineer of the Contractor's drawings shall not be held to relieve the Contractor of his obligation to meet all the requirements of the Specifications or of his responsibility for the correctness of the Contractor's drawings or of his responsibility for correct fit of assembled parts in final position or of his responsibility for the adequacy of method of construction.

For clarity and consistency, Industry Foundation Classes (IFC) export settings are to be recorded in the project Building Information Modeling Execution Plan (BEP) and must be consistent throughout the project.

The Contractor must assure that his staff on site has knowledge and experience in using all associated systems required for proper coordination and documentation of the project in all stages. In case Contractor staff requires any training, then the Contractor must arrange for training courses and must bear all expenses arising from such training courses.

19 AS-BUILT DRAWINGS

The Contractor shall, at all times, keep on the site one copy of all drawings and approved samples together with copies of all building, mechanical, electrical and public safety codes and relevant standards applicable to the works. All such material shall be made available to the Engineer.

In addition, the Contractor shall, at all times, keep on site a separate set of prints on which shall be noted neatly, accurately and promptly as the work progresses all significant changes between the work shown on the drawings and that which is actually constructed. The sub-Contractors shall each keep on site, at all times, a separate set of prints of the drawings showing their parts of the work on which shall be noted, neatly accurately and promptly as work progresses the exact physical location and configuration of the works as actually installed, including any revisions or deviation from the Contract Documents.

At the completion of the works, the Contractor shall at his expense, supply to the Engineer six copies and one reproducible copy of all drawings along with CD containing all as built drawings amended to comply with the work "As Built". The Contractor shall provide in the same format as the original drawings, any additional drawing required to record the work.

20 RESTORATION AND CLEANING

The Contractor shall do regular cleaning and clean away all rubbish and excess materials that may accumulate from time to time on completion and before handing over. Upon completion of the works he shall obliterate all signs of temporary construction facilities such as work areas, structures, foundations of temporary structures, stock piles of excess or waste materials, or any other vestiges of construction, unless otherwise directed by the Engineer. The works and site shall be left in a clean and satisfactory state for immediate use and occupation. Care shall be taken not to use any cleaning materials which may cause damage to the surface to be cleaned.

21 PROTECTION OF THE WORKS

The Contractor shall whenever necessary cover up and protect the works from weather and damage by his own or other workmen performing subsequent operation. He shall provide all necessary dust sheets, barriers and guard rails and clear away the same at completion.

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The Contractor shall take all proper steps for protection at all places on or about the works which may be dangerous to his workmen or any other person or to traffic. The Contractor shall provide and maintain warning signs, warning lamps and barricades as necessary.

22 PRODUCT DATA

Manufacture's standard schematic drawings shall be modified or deleted to indicate only information which is applicable to the project. Such standard information shall be supplemented to provide all additional applicable information.

Manufacturer's catalogue sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive literature shall be clearly marked to identify pertinent materials products or models. Dimensions and required clearances shall be indicated. Shop performance characteristics and capacities shall be noted.

23 SAMPLES

23.1 The Contractor shall furnish for approval of the Engineer with reasonable promptness all samples as directed by the Engineer or specifically called for in these Specifications. The Engineer shall check and approve such samples with reasonable promptness for compliance with the requirements of Contract Documents. All work shall be in accordance with approved samples.

23.2 Duplicate final approved samples, in addition to any required for the Contractor's use, shall be furnished to the Engineer, one for office use and the other for the Site.

23.3 Samples shall be furnished so as not to delay fabrication, allowing the Engineer reasonable time for consideration of the sample submitted.

23.4 Each sample shall be properly labelled with the name and quality of the material, manufacturer's name, name of the project, the Contractor's name and the date of submission, and the Specifications Article number to which the sample refers.

23.5 The manufacturer's installation directions shall be provided with each sample. The Contractor shall pay all transportation costs and deliver samples to the Engineer's office, Site or testing laboratory as directed by the Engineer.

Samples will not be returned unless return is requested at the time of submission; all packing and transportation costs for the return of samples shall be paid by the Contractor.

23.6 Samples shall be of adequate size and number to permit proper evaluation of the material by the Engineer. Where variations in colour, texture, dimensions or other characteristics are to be expected, the Contractor shall submit samples showing the maximum range of variation. Materials exceeding the range of variation of the approved samples shall not be used on the Work.

23.7 If and Shop Drawings and samples are required for the same item, the Engineer may require both to be submitted before approving either.

23.8 No acceptance or approval of any Shop Drawings or sample, or any indication or directions by the Engineer on any Shop Drawings shall constitute an authorization for any increase in the Contract Sum.

24 PRODUCT QUALITY AND HANDLING

Suppliers of local and foreign products and installations specified shall have been regularly engaged in the business of manufacturing, fabricating, installing and / or servicing work required for a period not less than Five (05) years. In addition, the Engineer may request as appropriate a:

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- list of similar installations that describes project, scope and date of completion.
- complete literature, performance data, and technical data.
- list of services record within Pakistan.
- location of service office from which this installation could be maintained.

For the actual fabrication, installation, and testing of the specified work, use only thoroughly trained and experienced workmen completely familiar with the items required and with the manufacturers recommended methods of installation. In acceptance or rejection, no allowance will be made for the lack of skill on the part of workmen.

Use all means necessary to protect materials before, during and after installation and to protect the installed work and materials of all other trades. In the event of damage, immediately make all repairs and replacement necessary for approval and at no additional cost to the Employer.

25 INSPECTION & TESTS REPORTS

All equipment and materials furnished under these specifications and all work performed in connection therewith will be subject to rigid inspection by the Engineer or the Engineer's Representative. Acceptance of equipment and material or the waiving off inspection thereof shall in no way relieve the Contractor of his responsibility for meeting the requirements of the Contract.

The Contractor shall furnish the Engineer with certified true copies of test reports of all materials used in the manufacture and fabrication of equipment and material. The result of these tests shall be in such form as to show compliance with the applicable Specifications, standards and codes for the material used.

26 ACCIDENT PREVENTION, PROTECTIVE EQUIPMENT

The Contractor shall comply and enforce compliance by all his sub-contractors with the highest standards of safety and accident prevention in accordance with international standards and in compliance with all applicable laws, ordinances and statutory provisions in Pakistan.

All requisite barriers, fences, warning signs, lights and other safety precautions as required for the protection of persons and property on or adjacent to the site shall be provided at the Contractor's cost.

All warning signs shall be in two languages, English and Urdu, and shall at all times be maintained in a clean and legible condition, to the satisfaction of the Engineer.

Trash shall be removed at frequent intervals to the satisfaction of the Engineer.

27 HEALTH SAFETY & ENVIROMENTAL REQUIREMENTS

The Contractor during execution of contract / project shall provide all the required, Personal Protective Equipment (PPE) for the staff working at sites for their Health & safety either they would be from Employer's personnel, Consultant's personnel, Contractor's personnel, Sub-Contractor's personnel & Site visitors. Not limited but minimum requirement would include helmets, special shoes, gloves, harness belts, nose cover and other proper resources for their Health & safety. HSE requirements should be included in the Project Execution Plans prepared at the start of Project. The Contractor shall appoint qualified HSE Engineer deputed at sites during working hours and make sure for the implementation of HSE requirements. The cost for providing these Health & safety facilities shall be borne by the Contractor till the

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closure of contract and no extra payment would be made in this account and the cost of providing these facilities deemed to include in the contract rates quoted for the works.

28 TEMPORARY FACILITIES

The Contractor shall provide, erect or install, maintain, alter as necessary and remove on completion except as otherwise directed by the Engineer all temporary facilities and services including access roads as described hereinafter and/or in the Procurement Document.

The Contractor's temporary site office shall be available for use not later than one month after the date of the site handing over.

Installation of temporary services at the site shall be given priority over all other construction at the site.

28.1 Temporary Road

The Contractor shall prepare and maintain such temporary roads as may be necessary, from the site to the nearest road and also within the site. Such roads shall be positioned strictly in accordance with the Engineer's instructions and the Contractor shall reduce or control any dust nuisance by spraying with water as directed. The Contractor shall satisfy himself as to the locations and nature of the proposed access routes to the site and shall be responsible for preventing any damage whatsoever to adjacent property and vegetation and keeping the access road free from debris at all times.

28.2 Temporary Services

(a) Temporary Water Supply

The Contractor shall supply in sufficient quantity all necessary potable and other water for construction purposes for all trades at point within a reasonable distance of the work. He shall make arrangements and pay charges for water service installation, maintenance and removal thereof, and pay the costs of water for all trades.

When the permanent water supply and distribution system has been installed, it may be used as the source of water for construction purposes provided that the Contractor obtains the written approval of the Engineer and the Employer and assumes full responsibility for the entire water distribution system and pays all charges/costs for operation and maintenance of the system mutually agreed between the Employer and the Contractor.

Temporary pipe lines and connections from the permanent service line, whether outside or within the area of site of works but necessary for the use of Contractor and his sub-contractor shall be installed, protected and maintained at the expense of the Contractor.

At completion of the work or at such time as the Contractor makes use of the permanent water supply installation, the temporary water services equipment and piping shall be removed by the Contractor at his own expense.

(b) Temporary Electricity

The Contractor shall make all the necessary arrangements for a temporary electricity service, pay all expense in connection with the installation, operation and removal thereof and pay the costs of electricity consumed by all trades.

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In the event that the site cannot be connected to a local electricity network or where the available power is insufficient the Contractor has to make his own provision and maintain such installation.

A temporary lighting system shall be furnished, installed and maintained by the Contractor as required to satisfy the minimum requirements for safety and security. The temporary lighting system shall afford adequate general illumination to all building areas. Adequate outdoor lighting shall be provided to illuminate staging trenches and the like to the satisfaction of the Engineer and general illumination throughout adequate for watchmen and emergency personnel.

Temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of governing codes. Temporary wiring shall be maintained in a safe manner and utilized so as not to constitute a hazard to persons or property.

When the permanent electrical power and lighting systems are in an operating condition, they may be used for temporary power and lighting for construction purposes provided that the Contractor obtains the written approval of the Engineer and the Employer and assumes full responsibility for the entire power and lighting system and pays all charges/costs for operation and maintenance of the system mutually agreed between the Employer and the Contractor.

Approval, license etc. if required under local laws will be obtained by the Contractor on his own responsibility and cost.

At completion of construction work, or at such time as the Contractor makes use of permanent electrical equipment and devices, temporary electricity services shall be removed by the Contractor as his own expense.

(b) Waste Disposal

The Contractor shall make such temporary provisions as may be required in order to dispose of any chemicals, fuels, grease, bituminous materials, waste and soil waste and the like without causing pollution to either the site or the environment. Disposal of any materials, wastes, effluents, garbage, oil, grease, chemicals and the like shall be in areas specified by the concerned local authority proposed by the Contractor and subject to the approval of the Engineer. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed off as directed by the Engineer and replaced with suitable fill material compacted and finished with topsoil all at the expense of the Contractor.

(c) Fire Protection

The Contractor shall provide and maintain adequate fire protection in the form of barrels of water with buckets, fire bucket tanks, fire extinguishers, or other effective means ready for instant use, distributed around the project and in and about temporary inflammable structures during construction of the works.

Gasoline and other flammable liquids shall be stored in and dispensed from safety containers approved by the Engineer and storage shall not be within building.

Torch-cutting and welding operations performed by the Contractor shall have the approval of the Engineer before such work is started and a chemical extinguisher is to be available at the location where such work is in progress.

The Contractor shall follow the instructions and specifications of the Civil Defence Department and or other local authority.

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29 CONSTRUCTION PROGRAMME

A Construction programme shall be maintained in accordance with the provisions of the General Conditions of Contract.

Construction programme shall be prepared on approved CPM programming software. The approved construction programme should be regularly updated with actual progress achieved at site for intervals of no longer than one month.

The Construction programme shall be accompanied with procurement schedule having sufficient data and information including all necessary particulars of constructional plant, equipment, machinery, temporary Works, arrival of plant, equipment at site and their installation, method of operation, work forces employed, etc., for activities of the Works.

Construction programme shall be revised as per the requirements of the Employer from time to time.

Whenever necessary and wherever the progress of the actual work shows departure, the programme and time schedule shall be updated and submitted to the Engineer for his approval.

Assessment of impact of delays if any (whether Contractor's delays or Employer's delays) shall be on most appropriate (i.e. Window Time Analysis) retrospective delay analysis technique or any other method duly approved by the Engineer to assess Extension of Time or Liquidated damages.

30 NOTIFICATION TO THE ENGINEER

The Engineer's Representative shall be notified daily in writing of the nature and location of the Works the Contractor intends to perform the next day so as to enable necessary inspection and measurement to be carried out. The Engineer may, if necessary, direct that longer notice be given of certain operations.

31 NIGHT WORK

When work is done at night the Contractor shall maintain from sunset to sunrise such lights on or about his work and plant as the Engineer may deem necessary for the proper observations of the work and the efficient prosecution hereof.

32 WEATHER

No work is to be undertaken when, in the opinion of the Engineer, the weather is so unsuitable that proper protection of the work cannot be ensured.

33 CO-ORDINATION WITH OTHER CONTRACTORS

The Contractor shall make all necessary coordination with other Contractor and shall make sure that all embedding components such as pipes, steel bases etc. (as required for completion of electrical and other works) are properly, accurately and timely installed.
The Contractor shall inform other contractors if any, the schedule of any construction activity well in advance giving him sufficient time to finish his part of job, before any compaction/concreting etc. The Contractor shall get the signature of the authorized representative of the other contractor, before carrying out any construction activity.

If any part of existing work is damaged or has to be dismantled or redone due to negligence/omissions/incorrect position of the embedding etc. on part of the Contractor, all such losses/expenses shall be borne by the Contractor.

All expenses incurred for the above works including coordination are deemed to be covered in his Bid cost and no separate/extra payment shall be paid against such item.

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34 SUBMISSION REQUIREMENTS

34.1 Schedule submission at least sixty days before the dates when reviewed submittals will be needed.

34.2 Submit Shop Drawings as per provision given in Sub-Clause 18.5 (a) of this General Requirements and number of copies of Product Data which the Contractor requires for distribution plus four copies which will be retained by the Engineer.

34.3 Submit three samples unless otherwise specified.

34.4 Accompany submittals with transmittal letter, in duplicate, containing:

- Date
- Project title and number
- Contractor's name and address
- The number of each Shop Drawing, Product Data and the Sample submitted.
- Notification of deviations from Contract Documents.
- Other pertinent data.

35 RESUBMISSION REQUIREMENTS

Shop Drawings:

- Revise initial shop drawings as required and resubmit as specified for initial submittal.
- Indicate on shop drawings any changes which have been made by the Engineer.
- Product Data and Samples: Submit new data and samples as required for initial submittal.

36 SURVEY INSTRUMENTS

All the instruments, equipment, stakes and other material necessary to perform all work shall be provided by the Contractor. The survey work shall be carried out by competent staff consistent with the current practices. The Contractor shall maintain on site surveying instruments in perfect working conditions to enable the Engineer to check lines and level at all times.

Survey instruments and equipment shall include but not limit to the following:

- Electronic Total Station
- Electronic Data Recorder
- Laser Distometer
- Precision Level Invert Staff
- Automatic Levels
- Power level
- Compass, steel tape, ranging poles

37 MONTHLY PROGRESS REPORT AND PHOTOGRAPHS

37.1 During the continuance of the Contract, the Contractor shall submit monthly progress reports on forms as approved by the Engineer. Such monthly reports shall show the actual progress completed as of date of the report plotted against the schedule as given by the Contractor at

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the start of work and shall be broken down so as to indicate status of all activities associated with mobilization, design, material procurement, manufacture, surveys works, tests with regard to the agreed Contract programme.

37.2 The Employer and the Engineer reserve the right to coordinate the schedules of this Contractor and other contractors working at the Site, and to adjust and/or change any and all such schedules as required during the course of construction in order to achieve a coordinated project in harmony with the completion date.

37.3 Commencing after the first month of construction, and continuing every month until completion, the Contractor shall take and submit photographs to the Engineer's Representative, to show progress of his work and completion of each structure or major feature.

38 CONTRACTOR TO NOTIFY DELAYS ETC.

Any delay which will affect the completion of Works shall be detailed by the Contractor who shall state the action he is taking for effective completion of the Contract programme.

The Contractor shall submit a report in respect of the various sections of the Works, the equipment in use or held in readiness, a return of labour and supervisory staff and details of any matters arising which may generally affect the progress of the work.

The Contractor shall give a summary of the detailed progress report giving the position with regard to the agreed Contract programme.

The progress reports shall be set out in a format to the approval of the Engineer, and forwarded promptly so that on receipt the information contained therein is not more than 21 days out of date.

If during execution of the Contract, the Employer considers the progress position of any section of the work to be unsatisfactory, or for any other reason relating to the Contract, he will be at liberty to convene a meeting and the Contractor’s Representatives are to attend such meeting.

The Contractor's Site Office shall prepare and submit 6 copies of a monthly progress report along with the photographs to the Employer and Engineer's Site Office. This report shall summarize site activities and record and details where difficulties in maintaining the agreed programme are being experienced or are likely to cause subsequent delay.

The Contractor's Site Office shall also prepare and submit to the Engineer's Site Office 2 copies of Daily Activity Report summarizing the main activities to be undertaken each day, noting special activities such a tests, alignment checks, etc. The Contractor shall be responsible for submitting daily, manpower & equipment details deployed at site. The contractor shall also be responsible for expediting the delivery of all material and equipment to be provided by himself and his subcontractors if any.

All the cost pertaining to payment to the Engineer, his staff and facilities due to delays attributed to be due to the Contractor’s fault shall be the responsibility of the Contractor.

39 PHOTOGRAPHS

As soon as work commences on Site, the Contractor shall provide photographs of the works from positions to be selected by the Engineer. Each photographic / digital print shall not be less than 297mm x 210mm and shall bear a printed description, a serial number and the date when taken.

The negatives/soft copies of all photographs shall be held at the Contractor’s Site Office, numbered and handed over to the Employer at the completion of the Contract.

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40 SITE CONSTRAINTS / CHALLENGES

The Contractor must be aware of and foresee the challenges during implementing the repairs works, some of them but limited to, are given below:

- The tidal variation (daily & seasonal) may shorten the working time beneath the jetty and at approach bridges.
- Wet and dry cycle
- Shoring from seabed may be difficult hence Contractor to look for alternate shoring methods to release structure members under dismantling and repair
- Requirement of water tight formwork for form cast repairs.

41. FACILITIES FOR THE EMPLOYER

41.1 Equipment's / Site Office

The Contractor shall furnish and equipped designated Employer's site office with brand new furniture, equipment, air-conditioners, electrical fittings as listed thereafter etc including janitorial staff and peons as per the specifications for the full Construction and Defects Notification Period. The Contractor shall provide at least the items listed below and additionally as per requirement of site or as directed by Employer:

1	Executive Wooden office table with drawers and side racks (standard size)	01 (One) No.
2	Executive Officer's revolving Chairs	01 (One) No.
3	Wooden office table with drawers and side racks (standard size)	02 (Two) Nos.
4	Officer's revolving Chairs	02 (Two) Nos.
5	Wooden sitting visitor's chairs with arms (standard size)	06 (Six) Nos.
6	Computer Table	02 (Two) Nos.
7	Steel filing cabinet (standard size)	02 (Two) Nos.
8	Peon / Janitor	01 (One) No. Each
9	Laptop Core i7 (13th/14th Generation), 16 GB RAM, 1 TB SSD, 4GB Graphics card, etc. (As per the instructions of the Employer)	01 (One) Nos.

If any equipment, furniture and installations become unserviceable for any reason whatsoever the Contractor shall promptly replace the same as and when directed by the Employer. The Employer's Site office with fittings, fixtures and all other equipment/accessories shall be maintained and operated for the entire duration of construction period as well as for the duration of subsequent Defects Notification Period.

The Site Building Office including fittings, fixtures, furniture, furnishing and all other equipment/accessories shall become the property of the Employer on completion of the Contract.

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In case of non-supply of any of the above-mentioned facilities within the stipulated time, the cost of above-mentioned items will be calculated by the Employer on the current market rate and the said cost will be deducted from the Contractor's Interim Payment Certificate.

41.2 **Transport Facility**

The Contractor shall provide, operate, maintain and repair new air-conditioned Vehicles in accordance with the below table, together with spare keys, registration papers, insurance certificate and other related documentation, for the exclusive use of the Employer's team to meet his transportation needs (on and off Site) for the entire project's duration in addition to the subsequent Defect Notification Period. The use of such transport facility shall be under the control of the Employer:

Sr. No.	Item	Quantity
1.	1300 cc (AC Fitted)	2

The Contractor shall provide, operate, and maintain new vehicles as indicated in these specifications or equivalent, with air conditioning for the exclusive use of the Employer's team to meet their transportation needs for the entire duration of the actual construction period, as well as for the duration of the subsequent Defects Notification Period. The use of such transport facility shall be under the control of the Employer. The Contractor shall be wholly responsible for providing at all times satisfactory operating services for the Employer. The Contractor shall furnish, supply, and provide, as may be necessary without specific direction of the Employer, all fuels (200 Liters of petrol/Diesel per month for each vehicle), lubricants, tyres, and other supplies, all maintenance, repairs, and running costs, and suitably qualified drivers at all times.

Prior to ordering the vehicles, the Contractor shall furnish to the Employer for approval detailed specifications, the name of the manufacturer, and the model no. of the vehicles to be supplied. This data shall be presented within one week from the date of the Engineer's Order to proceed with the works, and the vehicle shall be furnished to the Employer upon approval within two weeks from the date of the Engineer's Order to supply the Vehicle.

The vehicles shall be right-hand drive and shall be brand new, properly serviced, and ready for use. The Contractor shall provide the vehicle to replace any such motor vehicle that is temporarily or permanently rendered unserviceable for any reason or declared to be beyond repair by the Employer, at no additional cost to the Employer. The vehicles shall become the property of the Employer on completion of this Contract.

42. **FACILITIES FOR THE ENGINEER**

42.1 **Equipment's / Site Office**

The Contractor shall furnish and equipped the designated Engineer's site office with brand new furniture, equipment, air-conditioners, electrical fittings as listed thereafter etc including janitorial staff and peons as per the specifications for the full Construction and Defects Notification Period. The Contractor shall provide at least the items listed below and additionally as per requirement of site or as directed by Engineer**:**

1	Executive Wooden office table with drawers and side racks (standard size)	01 (One) No.
2	Executive Officer's revolving Chairs	01 (One) No.

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3	Wooden office table with drawers and side racks (standard size)	02 (two) Nos.
4	Officer's revolving Chairs	02 (two) Nos.
5	Wooden sitting visitor's chairs with arms (standard size)	06 (Six) Nos.
6	Computer Table	02 (Two) Nos.
7	Steel filing cabinet (standard size)	02 (Two) Nos.
8	Split DC Inverter Unit (1-1/2 tonne) with stabilizer or approved equivalent	01 (One) Nos.
9	Water Dispenser with all accessories including daily supply of mineral water and routine maintenance	01 (One) No.
10	Electric Kettle & Microwave oven	01 (One) No. Each
11	Peon / Janitor	01 (One) No. Each
12	Laptop Core i7 (13th/14th Generation), 16 GB RAM, 1 TB SSD, 4GB Graphics card, etc. (As per the instructions of the Employer)	02 (One) Nos.
13	4TB Expansion Portable USB 3.0/3.1 External Hard Drive, preformatted exFAT, with Bus Powered and Rescue Data Recovery Services	01 (One) No.
14	Wireless Internet Connection of LTE with unlimited downloads or approved equivalent (4 MBPs)	01 (one) Nos.
15	Laser Jet Color Printer with Scanner (A4 Size) and photocopier	01 (One) No.
16	Office supplies and stationeries as per site Requirements and direction of Engineer's Representative/Resident Engineer.	Each month

If any equipment, furniture and installations become unserviceable for any reason whatsoever the Contractor shall promptly replace the same as and when directed by the Engineer. The Engineer's Site office with fittings, fixtures and all other equipment/accessories shall be maintained and operated for the entire duration of construction period as well as for the duration of subsequent Defects Notification Period.

The Site Office including fittings, fixtures, furniture, furnishing and all other equipment/accessories shall become the property of the Employer on completion of the Contract.

In case of non-supply of any of the above mentioned facilities within the stipulated time, the cost of above mentioned items will be calculated by the Engineer on the current market rate and the said cost will be deducted from the Contractor's Interim Payment Certificate.

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42.2 **Transport Facility**

The Contractor shall provide, operate, maintain and repair new air-conditioned Vehicles in accordance with the below table, together with spare keys, registration papers, insurance certificate and other related documentation, for the exclusive use of the Engineer's team to meet his transportation needs (on and off Site) for the entire project's duration in addition to the subsequent Defect Notification Period. The use of such transport facility shall be under the control of the Engineer:

Sr. No.	Item	Quantity
1.	1000cc (AC Fitted)	1

The Contractor shall provide, operate, and maintain new vehicles as indicated in these specifications or equivalent, with air conditioning for the exclusive use of the Engineer's team to meet their transportation needs for the entire duration of the actual construction period, as well as for the duration of the subsequent Defects Notification Period. The use of such transport facility shall be under the control of the Engineer. The Contractor shall be wholly responsible for providing at all times satisfactory operating services for the Engineer. The Contractor shall furnish, supply, and provide, as may be necessary without specific direction of the Engineer, all fuels (300 Liters of petrol/Diesel per month for the vehicle), lubricants, tyres, and other supplies, all maintenance, repairs, and running costs, and suitably qualified drivers at all times.

Prior to ordering the vehicle, the Contractor shall furnish to the Employer for approval detailed specifications, the name of the manufacturer, and the model no. of the vehicle to be supplied. This data shall be presented within one week from the date of the Engineer's Order to proceed with the works, and the vehicle shall be furnished to the Engineer upon approval within two weeks from the date of the Employer's Order to supply the Vehicle.

The vehicle shall be right-hand drive and shall be brand new, properly serviced, and ready for use. The Contractor shall provide the vehicle to replace any such motor vehicle that is temporarily or permanently rendered unserviceable for any reason or declared to be beyond repair by the Engineer, at no additional cost to the Engineer. The vehicle shall be become the property of the Employer on completion of this Contract.

43. MEASUREMENT AND PAYMENT

No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities or herein.

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

*** End of Section 0100 ***

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SECTION - 0120

CONTRACTOR'S CAMP

1. SCOPE

The work to be done under this item consists of construction, erection, installation and maintenance of the Contractor's Project Site Offices or main camp and the Contractor's sub-camps or temporary camps, if any, and shall include all offices, shops, warehouses, and other operational buildings; all housing and related facilities including accommodations for the Contractor's personnel.

2. GENERAL

The location of the Contractor's camps, including all buildings, utilities and facilities therefor, and of the camps or establishments of all persons/parties in the vicinity operating or associated with the Contractor shall be subject to approval of the Engineer.

The work to be done under this item will terminate upon the actual Completion Date. However, if directed by the Engineer or the Employer, the Contractor shall continue such work to the extent required by the Contractor's personnel during the Defects Liability Period. No compensation shall be paid for the continued operation and maintenance of the Contractor's Camps during the Defects Liability Period.

Upon completion of the Works, or at such time within the Defects Liability Period as directed by the Engineer, the Contractor shall remove all buildings, utilities and other facilities from the Site and restore all camp areas to a neat and clean condition. The Employer may opt to retain any or all of the above mentioned facilities for his use after the completion of the works, in which case the Contractor shall have no claim on these facilities.

Contractor shall protect the environmental interests and HSE (Health, safety & Environmental) regulations at camp and works sites during execution of the contractual work.

3. CODES AND STANDARD

The construction, operation and maintenance of all camps of the Contractor shall comply with all applicable provisions of current Pakistan Labour Camp Rules.

4. MAINTENANCE

The Contractor shall furnish, make arrangements for, and carry out proper and adequate maintenance of the Contractor’s Camp areas at such camp to provide a neat, well-kept camp in all respects with pleasant and healthy surroundings and conditions for all occupants of their camp. The Contactor’s camp shall be kept clean, well-graded, free from under growth and bush and adequately drained. Roads and streets shall be kept in good condition. All utilities shall be adequately and properly operated and maintain to provide services and conditions meeting the requirements of these specifications in all respects.

Adequately equipped and properly staffed portable first aid stations or dispensaries shall be provided by the Contractor at camps and other strategic locations to administer first aid treatment at any time required and free of charge to all persons on the Site, including employees of the Engineer and the Employer.

5. MEASUREMENT AND PAYMENT

No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities or herein.

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

*** End of Section 0120 ***

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SECTION - 0130

STAKE-OUT SURVEY

1. SCOPE

The work to be done under this item the Contractor shall make the stakeout survey for construction purposes with competently qualified men, consistent with the current practices. The work shall proceed immediately upon the award of the Contract and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Engineer. The Contractor shall keep the Engineer fully informed as to the progress of the stakeout survey. The scope of this section of specifications is covered by detailed specifications as laid down herein.

2. MATERIAL AND EQUIPMENT

All instruments, equipment, stakes and other material necessary to perform all work shall be provided by the Contractor. These instruments and equipment shall be available to Engineer at all times for the purpose of checking the work of the Contract.

All stakes used shall be of a type approved by the Engineer, clearly and permanently marked so as to be legible at all times. It shall be the Contractor's responsibility to maintain these stakes in their proper position and location at all times. Any existing stakes or markers defining property lines and survey monuments which may be disturbed during construction shall be properly tied into fixed reference point before being disturbed and accurately reset in their proper position upon completion of the work.

3. CONSTRUCTION

The Contractor shall trim trees, bushes and other interfering objects, not consistent with the plan, from survey lines in advance of all survey work to permit accurate and unimpeded work by his stake-out survey crews and the Engineer's survey crews. The exact position of all work shall be established from control points, which are shown on the plans or modified by the Engineer. Any error, apparent discrepancy in or absence of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required.

The Contractor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc. throughout the life of the Contract. Damaged, destroyed or inaccessible reference points, bench marks or stakes shall be replaced by the Contractor. Existing or new control points that will be or are destroyed during construction shall be re-established and all reference ties recorded thereon shall be furnished to the Engineer. All stakeout survey work shall be referenced to the centerlines shown on the Plans. All computations necessary to establish the exact position of the work from control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be kept neatly and made available to the Engineer upon request and furnished to the Employer upon Contract completion.

The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be immediately made. Such checking by the Engineer shall not relieve the Contractor of any of his responsibilities for the accuracy or completeness of his work.

Reference points, base lines, stakes and benchmarks for borrow pits shall be established by the Contractor.

All required right-of-way and easement limits shall be established, staked and referenced by the Contractor concurrent with the construction stakeout survey.

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The Contractor shall place at least two offset stakes or references at each centre lines station and at such intermediate stations as the Engineer may direct. From computations and measurements made by the Contractor, these stakes shall be clearly marked with the correct centre line, station number, offset and cut or fill so as to permit the establishment of the true centre line location during construction. He shall locate and place all cut, fill, slope, line grade or other stakes and points as the Engineer may direct to be necessary for the proper progress of the work.

4. MEASUREMENT AND PAYMENT

No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities or herein. The cost thereof shall be deemed to have been included in the quoted unit rate of other items of the Bill of Quantities.

*** End of Section 0130 ***

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SECTION – 0200

DEMOLISHING & DISMANTLING WORKS

1. SCOPE

The work covered by this Section of the Specifications consists of furnishing all plant, labour, equipment, appliances and performing all operations in connection with demolition/ dismantling and removal of existing sheds, jetty structures, asphalt road, pavement, kerbs, medians, foundations, stone pitching, approaches/plate forms, buildings, trees, plants, removal of services with accessories, embankments, plain & reinforced concrete and concrete/ block masonry structures including disposal of demolished/ dismantled and removed material to designated places. Whole work shall be done in accordance with these specifications, drawings and as directed by the Engineer.

2. GENERAL REQUIREMENTS

2.1 The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed, unless otherwise directed. Materials that cannot be removed daily shall be stored in areas specified by the Engineer. In the interest of conservation, salvage shall be pursued to the maximum extent possible. The usable/salvaged material shall become the property of the Employer.

2.2 All existing structures and utilities obstructing the construction shall be demolished with the approval of the Engineer. For further details and extent of demolition work refer to drawings.

2.3 The Bidder must already describe in his Specifications in detail and support by sketches the proposed method, as well as auxiliary means, equipment, working sequence etc. for the stripping, cutting, dismantling, salvage and complete removal of the structures destined for demolishing. Before the commencement of any demolition work the Contractor shall get his programme approved by the Engineer. The programme shall state the Contractor’s proposed sequence of work, his method of operation, the plant and equipment he proposes to use for such work and the time for each operation shall be clearly indicated.

2.4 The Employer and the Engineer do not guarantee or warrant in any way the correctness of data relating to structures to be demolished as are exhibited or indicated in the Specification or on the Drawings. Such data are only provided for Contractor's general information.

2.5 The Contractor is deemed to have assessed the volume of demolishing works and associated risks and to have included for all auxiliary works, floating plant, special equipment for salvage and underwater works, diving teams etc., in the lump sum rates to be quoted against the items in the Bills of Quantities, relative to the demolishing of the individual structures. The Employer does not accept any claim whatsoever by the Contractor on account of additional works, working difficulties etc., arising out of situations or conditions different to those assessed by him prior to or after submitting the Tender.

2.6 The Contractor shall have satisfied himself as to the actual condition and nature of the structures and material to be demolished and bears the entire risk for the present condition of the structures whether on land, above or below water level, for the stability of the structures at all stages of stripping, dismantling and of complete demolishing in accordance with the Specification.

2.7 Demolition work is to be undertaken well planned, with special care, in order not to endanger neither life nor the stability of adjacent structures, and also not to unduly hamper the port operations. The Contractor is obligated to inform the Engineer daily of the planned demolishing works.

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2.8 Any scaffolding required shall be designed and erected in accordance with the relevant national and international standards. Erection of scaffolding shall be carried out by an experienced and competent scaffolder and it shall be of an independent tied type. The Contractor shall ensure that all necessary adjustments, which are required to the scaffolding to ensure its stability, are made as the work proceeds. Care shall be taken that the load of any debris collecting on a scaffold does not exceed the loading for the design. All measures necessary shall be taken to prevent debris from being accidentally dislodged from the platform. Scaffolds, cranes and other equipment shall at all times during use be suitable for the purpose for which they are intended and shall comply with any local Authority requirements.

3. SUBMITTALS

The procedures proposed for the accomplishment of the work.

The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required, careful removal and disposition of materials specified to be salvaged, protection of property which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and the sequence of operations.

4. DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it could result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

5. PROTECTION

5.1 Protection of Personnel

5.1.1 During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or components of Jetty and Approach Bridges or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

5.1.2 The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

5.2 Protection of Existing Property

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the User; any damaged items shall be repaired or replaced as approved by the Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

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5.3 Protection From the Weather

The usable and salvageable materials shall be protected from the weather at all times handing over to the Employer.

5.4 Protection of Trees

Trees within the project site which might be damaged during demolition and which are indicated to be left in place shall be protected by a 1.83 m high fence. The fence shall be securely erected a minimum of 1.5 m from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Engineer.

6. BURNING

The use of burning at the project site for the disposal of refuse and debris shall not be permitted.

7. USE OF EXPLOSIVE

Use of explosives shall not be permitted.

8. PROCEDURES

8.1 The Engineer will define the limits where demolition/ dismantling and removal activity is to be done and shall approve the procedures/ methods to be adopted by the Contractor. The Contractor shall layout the boundaries/ limits for Engineer's checking and approval before commencing dismantling work.

8.2 Whole work shall be performed in an orderly manner and the Contractor shall take all necessary precautions and expedients to prevent damages to the adjacent structures, installed equipment/ machinery, pipes, conduits, any other installation etc. Any damage caused to the structures and installations due to negligence of the Contractor during demolition/ dismantled and removal operations shall be repaired/ replaced by the Contractor at his cost and to the satisfaction of the Engineer.

9. DEMOLITION OF SHEDS, STRUCTURES, ROAD, PAVEMENTS AND RAILWAY TRACKS, MASONRY WORKS, BUILDINGS, FENCE AND PLAIN/ REINFORCED CONCRETE

The Contractor shall demolish sheds, structures, road pavements , railway tracks, masonry / flooring works, stone pitching, buildings, fence and plain/ reinforced concrete works to the line and depth as shown on the Drawings or as directed by the Engineer. Explosives shall not be used to remove the plain and reinforced cement concrete or any other material whatsoever. Mechanically operated breakers, concrete saws, manually operated electric chisel, hand chisel, chipping hammers or other approved methods shall be employed for cutting. Care shall be taken that existing services and structures are not damaged. It shall be the responsibility of the Contractor to replace at his cost any services and structures damaged by the Contractor due to his negligence during cutting operations or thereafter until the whole of cut parts/ areas are restored to original condition to the satisfaction of the Engineer.

10. CLEARANCE OF GREEN AREA

The bushes/ plants in existing green area shall be cleared off up to the roots and the surface shall smoothen and cleared from all debris and any organic material before receiving new layer.

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11. REMOVAL OF EXISTING SERVICES/ UTILITIES

The Contractor shall mark all the services/ utilities falling within the ROW of the approach bridges and Jetty. After getting approval from the Engineer, the Contractor shall remove and/or retain all such services/ utilities as per the requirement/ specifications of the Employer.

12. DISPOSAL OF MATERIAL

12.1 All debris and materials resulting from demolition/dismantling works shall be disposed off to any suitable place with the approval of competent Authorities of the location /place with the prior intimation to the Engineer in the manner of disposition required by the Area authorities. No extra claim in this regard shall be entertained.

12.2 Unsalvageable Material

Concrete, masonry, and other noncombustible material, shall be disposed off the site.

12.3 All salvaged/ useable materials resulting from demolition and removal shall remain the property of the Employer and shall be stacked at designated places.

12.4 The Contractor shall segregate the useable materials as directed by the Engineer and stack at designated places.

13. CLEAN UP

Debris and rubbish shall be removed from site. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

All debris materials resulting from demolition / dismantling works shall be disposed off to places designated by the Engineer in the manner of disposition required and directed by the Engineer.

14. USE OF DISMANTLED MATERIAL

The non-reusable material like concrete, concrete blocks etc will be broken up to 3” down size and used as fill material for deep fill as directed by the Engineer and disposal of non fillable debris/ demolished/ removed materials at designated location including loading, unloading and transportation complete in all respect up to any leads as directed by the Engineer and up to the satisfaction of the Engineer. The non fill able debris will be disposed.

All useable materials like reinforcement, steel gates etc will be the property of the contractor.

15. MEASUREMENT AND PAYMENT

15.1 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.

15.1.1 Safety measures for adjacent infra structure and facilities.
15.1.2 Temporary diversion and safety measures, demarcation / layouts etc.

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15.1.3 Loading, unloading, transportation, disposal and stacking of all demolished/ dismantled/ removed material within free haulage limit of 15Km measured along the most direct route from the boundary of the project or to the place as designated by the Engineer.
15.1.4 Loading, unloading, transportation and stacking of all usable material to the place as designated by the Engineer.
15.1.5 Permissions/ approvals, if required, from the relative department and information to the stack holders.
15.1.6 Earth work
15.1.7 hessian cloth, plaster of Paris etc
15.1.8 Repair / finishing of adjacent component of dismantled structure.
15.1.9 Working platforms under the jetty and approach bridges
15.1.10 Shoring/support system of members resting on deteriorated elements.

15.2 Surface Preparation, Cutting/ Chiseling of Deteriorated Existing Reinforced Cement Concrete (Beam/ Top, Side & Bottom, Transom –Top, Side & Bottom)

15.2.1 Measurement

Measurement of Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated existing reinforced cement concrete works at any depth & level after installation of temporary support for existing structural member, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and Bill of Quantities will be made on the basis of actual volume in cubic meter of Surface Preparation, Cutting/ Chiseling of Deteriorated Existing Reinforced Cement Concrete

15.2.2 Payment

Payment will be made for acceptable completed works of Surface preparation of concrete for repairs including Cutting/ Chiseling of deteriorated Existing Reinforced Cement Concrete (either visible or underground up to any depth and height/level) on the basis of actual volume in cubic meter quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

15.3 Removal of Deck (Planks and Slab)

15.3.1 Measurement

Dismantling/removal of existing damaged/ deteriorated planks including overlaid top slab and other associated elements shall be carried out using saw cutter and in accordance with the approved methodology and with due care to prevent any damage to adjacent structural members, including existing planks, slabs, transom/ beam, pile cap, piles & their reinforcement, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer, as shown in the drawings and as mentioned in the Bill of Quantities will be made on the basis of actual volume in cubic meter of deck removed.

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15.3.2 Payment

Payment will be made for acceptable completed Dismantling/ removing of existing damaged/ deteriorated planks and slab and other element on the basis of actual volume in cubic meter quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

15.4 Surface Preparation, Cutting/ Chiseling of Deteriorated Existing Reinforced Cement Concrete (Planks/Slab/Deck)

15.4.1 Measurement

Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated existing reinforced cement concrete works at any depth & level, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and as mentioned in the Bill of Quantities will be made on the basis of actual volume in cubic meter of job dismantled/ cut / removed as shown on the Drawings or as directed by the Engineer.

15.4.2 Payment

Payment will be made for acceptable completed works of Cutting / Chiseling of Planks / Slabs & Deck on the basis of actual volume in cubic meter quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

15.5 Removal and Reinstallation of Existing Railing Hand Rails

15.5.1 Measurement

Careful dismantling, safe removal, and reinstallation of existing hand rails including all associated structural components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including bolts, plates, members, anchors, fittings, etc.) as required; surface preparation and application of painting or protective coating to the railing, wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, specifications, and as directed by the Engineer and as mentioned in the Bill of Quantities will be made on the basis of actual length in running meters of job removed as shown on the Drawings or as directed by the Engineer.

15.5.2 Payment

Payment will be made for acceptable completed Removal and reinstallation of existing hand rails on the basis of actual length in running meters quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

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15.6 Cleaning of Concrete Surface with High Pressure Clean Water

15.6.1 Measurement

Surface preparation of concrete for repairs including cleaning of concrete surfaces and flushing with high pressure clean water (minimum 200bar) with portable equipment, using potable water to remove all dirt, laitance, loose particles & contaminants etc.; complete in all respects or as directed by the Engineer and as mentioned in the Bill of Quantities will be made on the basis of actual area in square meters of clean surface.

15.6.2 Payment

Payment will be made for acceptable completed cleaning of concrete surface on the basis of actual area in square meters quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

15.7 Sand Blasting & Cleaning of Existing Corroded Steel Bars

15.7.1 Measurement

Sand blasting and Cleaning of existing corroded steel bars etc.; complete in all respect or as directed by the Engineer and as mentioned in the Bill of Quantities will be made on the basis of actual area in square meters of clean surface.

15.7.2 Payment

Payment will be made for acceptable completed Sand blasting and Cleaning of existing corroded steel bars on the basis of actual area in square meters quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

15.8 Dismantling/ Removal of existing old steel ladder

15.8.1 Measurement

Dismantling/ Removal of existing old steel ladder at any depth and level, stacking of useable material which shall be handed over to the Employer and disposal of debris/ unused/ demolished/ removed materials including loading, unloading and transporting etc. complete in all respect to designated places and up to any lead or as directed by the Engineer and as mentioned in the Bill of Quantities will be made on the basis of number of steel ladder dismantled /removed. Contractor is fully responsible for the safety and stability of existing structure and temporary works during dismantling/ removal works.

15.8.2 Payment

Payment will be made for acceptable Dismantling/ Removal of existing old steel ladder on the basis of actual number of steel ladder dismantled /removed quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

15.9 Removal of Jetty Fixtures & other Items

15.9.1 Measurement

Removal of Jetty fixtures & other items including existing MS ladders at any depth and level, stacking of useable materials which shall be

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handed over to the Employer and disposal of debris/ unused/ demolished/ removed materials including loading, unloading and transporting etc. complete in all respects to designated places and up to any lead or areas inside the harbour limits at specified location or as directed by the Engineer and as mentioned in the Bill of Quantities will be made on the basis of actual number of Jetty fixtures and other item removed.

15.9.2 Payment

Payment will be made for acceptable completed works of Removal of Jetty fixtures & other items including existing MS ladders will be made on the basis of actual number of Jetty fixtures and other item removed quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

15.10 Removal and Reinstallation of Existing Expansion Joint

15.10.1 Measurement

Careful dismantling, safe removal, and reinstallation of existing expansion joints including all associated components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including neoprene, plates, members, anchors, fittings, etc.) as required or wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, Bill of Quantities and as directed by the Engineer will be made on the basis of actual length in Running meter removed.

15.10.2 Payment

Payment will be made for acceptable completed works of Careful dismantling, safe removal, and reinstallation of existing expansion joints will be made on the basis of actual length in running meter quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

*** End of Section 0200 ***

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SECTION - 2100

FORMWORK

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 the supply and installation of water tight formwork for the purpose of containing concrete during placement and consolidation in the required shape & form and protect concrete being damaged due to tidal variations.

2.0 GENERAL

It shall be the responsibility of the Contractor to perform the work by engaging well trained and experienced staff.

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)

ACI 301 Specifications for Structural Concrete

- ACI 318 Building Code Requirements for Structural Concrete
- ACI 347 Guide to Formwork to Concrete (ANSI A145.1)

2.2 APA (Engineered Wood Association)

- EWA High Density Overlay Concrete Form, Class 1
- EWA Structural 1, Exterior Quality, Class 1
- EWA Plastic Overlay Plywood Forms

2.3 ANSI (American National Standard Institute)

- NBS PSI Voluntary Product Standard, Structural Plywood (ANSI-A199.1)

Latest editions of the codes/standards shall be used in all cases.

3.0 MATERIALS

The Contractor shall use the following materials for different purposes as stated below:

3.1 Timber: Form framing, sheathing and shoring.

3.2 Plywood: Form sheathing and panels.

3.3 Steel

- Heavy forms and false work
- Column and joint forms
- Permanent forms
- Welding of permanent forms

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3.4 Form Ties, Anchors and Hangers: For securing formwork against placing loads and ` pressures.

3.5 Coatings: Facilitate form removal.

3.6 Steel Joints: For formwork support.

3.7 Steel frame shoring: For formwork support.

4.0 **DELIVERY AND STORAGE**

4.1 Delivery

The delivery of formwork components shall be made in a manner so as not to cause damage.

4.2 Storage

Form work should be stored, after cleaning and preparing for re-use, if used before in such a manner that access to all different component is available.

Form work component which can be affected by weathering shall be stored in appropriate building or under covers and shade.

5.0 WORKMANSHIP

5.1 Forms shall have sufficient strength to withstand the pressure resulting from placement and vibration of the concrete and shall have sufficient rigidity to maintain specified tolerances.

Forms shall be water proof and water tight to protect the freshly poured concrete from exposure to sea water and being damaged/washed away/deteriorated by sea water due to tidal variations. Form shall not get damaged, bent and deformed due to immersion in the sea water.

Where required details and locations of special forms to be used are set out on the drawings. The Engineer may reject any formwork in any part of the work which has been constructed with a non- approved formwork. Approval of form work by the Engineer shall be one of these conditions to be fulfilled before concreting. The Engineer may reject any concreting where it does not conform to the approved model.

5.2 Earth cuts shall not be used as forms for vertical surfaces of reinforced concrete work unless required as such or permitted by the Engineer.

5.3 Formwork shall be of timber, steel, plywood, proprietary building boards and such special materials, as may be approved by the Engineer, which give the required finish and shape to the surface of concrete. Wooden formwork shall be free from loose knots and shall be well seasoned.

5.4 The formwork shall conform to the shape, lines and dimensions as shown on the plans, and be so constructed as to remain sufficiently rigid during the placing and compacting of the concrete, and shall be sufficiently tight to prevent loss of liquid from the concrete.

The design and engineering of the formwork, as well as its construction, shall be the responsibility of the Contractor. Where necessary, to maintain the specified tolerances, the formwork shall be cambered to compensate for anticipated deflections in the formwork due to the weight and pressure of the fresh concrete and due to construction loads.

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The Contractor shall establish and maintain, in an undisturbed condition and until final completion and acceptance of the project, sufficient control points and bench marks to be used as references for checking upon tolerances.

5.5 Requirements for `facing materials' are given in Clause 7, Section 2300 relevant to `Finishing of Formed Surfaces.'

5.6 Where natural plywood-form-finish, grout-cleaned-finish, smooth-rubbed-finish, scrubbed-finish, or sand-floated-finish is required, forms shall be smooth (faced with plywood, liner sheets, or prefabricated panels) and true to line, in order that the surfaces produced will require little dressing to arrive at true surfaces. Where any as-cast finish is required, no dressing shall be permitted in the finishing operation.

5.7 Where as-cast surfaces, including natural plywood- form-finish are specified, the panels of material against which concrete is cast shall be orderly in arrangement, with joints between panels planned in approved relation to openings, building corners, and other architectural features.

5.8 Where panels for as-cast surfaces are separated by recessed or otherwise emphasized joints, the structural design of the forms shall provide for locating form ties, where possible, within the joints so that patches of tie holes will not fall within the panel areas.

5.9 Forms shall not be re-used if there is any evidence of surface wear and tear or defect which would impair the quality of the surface finish. Forms shall be thoroughly cleaned and properly coated before re-use.

5.10 Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Unless otherwise specified in the Contract documents chamfer strips shall be placed in the corners of forms to produce beveled edges on permanently exposed surfaces. Interior corners on such surfaces and the edges of formed joints will not require beveling unless required by the Contract documents.

5.11 Positive means such as wedges or jacks for accurate adjustment and for proper removal of shores and struts shall be provided and all settlement shall be monitored during concrete placing operation. Forms shall be securely braced against lateral deflections.

5.12 Where concreting of thin members is required to be carried out within formwork of considerable depth, temporary openings in the sides of the formwork shall be provided where necessary to facilitate the placing and consolidation of concrete. Small temporary openings shall also be provided at the bottom of the formwork for columns, walls and deep beams to permit the cleaning out of debris and observation immediately before concrete is deposited.

5.13 Form ties shall be constructed so that the ends or end fasteners can be removed without causing appreciable spalling at the faces of the concrete. After the ends or end fasteners of form ties have been removed, the embedded portion of the ties shall terminate not less than twice the diameter or twice the minimum dimension of the tie from the formed faces of concrete to be permanently exposed to view and in no case shall this distance be less than 20mm. When the formed face of the concrete is not to be permanently exposed to view form ties may be cut off flush with the formed surfaces.

Through bolts may be permitted provided that they are greased to allow for easy withdrawal and the holes subsequently made good. Through bolts are not to be used on water-retaining structures.

5.14 At construction joints contact surface of the form sheathing for flush surfaces exposed to view shall overlap the hardened concrete in the previous placement by no less than 25mm. The forms shall be held against the hardened concrete to prevent offsets or loss of mortar at the construction joint so as to maintain a true surface.

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5.15 Wood forms for wall opening shall be constructed to facilitate loosening, if necessary, to counteract swelling of the forms.

5.16 Wedges used for final adjustment of the forms prior to concrete placement shall be fastened in position after the final check.

5.17 Formwork shall be so anchored to shores or to other supporting surfaces or members that upward or lateral movement of any part of the formwork system during concrete placement will not occur.

5.18 Runways or planks for moving labour and equipment shall be provided with struts or legs and shall be supported directly on the formwork or upon the structural member without resting on the reinforcing steel.

5.19 All surfaces of forms and embedded materials shall be cleaned of any accumulated mortar or grout from previous concreting and of all other foreign material before placing fresh concrete.

5.20 Forms shall be sufficiently tight to prevent leakage of grout or cement paste. Board forms having joints opened by shrinkage of the wood shall be removed and replaced. Plywood and other wood surfaces not subject to shrinkage shall be sealed against absorption of moisture from the concrete by either (1) a field applied, approved form oil or sealer, or (2) a factory applied non-absorptive liner. When forms are coated to prevent bond with concrete, it shall be done prior to placing of the reinforcing steel. Excess coating material shall not be allowed to stand in puddles in the forms nor allowed to come in contact with the concrete against which fresh concrete will be placed. Care shall be taken that such approved composition is kept out of contact with the reinforcement. Where as-cast finishes are required, materials, which will impart a stain to the concrete, shall not be applied to the form surfaces. Where the finished surface is required to be painted, the material applied to form surfaces shall be compatible with the type of paint to be used.

5.21 For reinforced concrete, under no circumstances shall forms be struck until the concrete attains strength of at least twice the stress to which the concrete may be exposed at the time of striking.

The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions, and cured under conditions of temperature and moisture similar to those obtaining in the work. Where possible, the formwork should be left for longer time as it would assist the curing.

In normal circumstances (generally where temperature are above 20° C and where ordinary cement is used) forms may be struck after expiry of the following periods:

- Walls, Columns & Vertical Sides of Beams & slab	48 Hours or as may be decided by the Engineer
- Beams Soffits	10 Days (shores or props left under)
- Removal of shores or props to Slabs	14 Days (Spanning up to 4 meters)
	16 Days (Spanning up to 5 meters)
	18 Days (Spanning up to 6 meters)

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For rapid hardening cement 3/7 of the above period will be sufficient in all cases except vertical sides of slabs, beams and columns which should be retained for a minimum of 24 hours.

The number of shores or props, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slab and beams, as the case may be.

Proper allowance shall be made for the decrease in rate of hardening of concrete in cold weather and the above minimum duration must be increased when the mean daily temperature is below 20° C.

5.22 When repair of surface defects or finishing is required at an early age, forms shall be removed as soon as the concrete has hardened sufficiently to resist damage from removal operations.

5.23 Top forms on sloping surfaces of concrete shall be removed as soon as the concrete has attained sufficient stiffness to prevent sagging. Any needed repairs or treatment required on such slopping surfaces shall be performed at once and be followed by the specified curing.

5.24 Wood forms for wall openings shall be loosened as soon as this can be accomplished without damage to the concrete.

5.25 All formwork shall be removed without such shock or vibration as would damage the reinforced concrete. Before the top plank and struts are removed, the concrete surface shall be exposed where necessary in order to ascertain that the concrete has sufficiently hardened. Proper precautions shall be taken to allow for the decrease in the rate of hardening that occurs with all cement in the cold weather.

5.26 When reshoring or repropping is permitted or required, the operations shall be planned in advance and shall be subject to approval. While reshoring is underway no live loads shall be permitted on the new construction.

In no case during reshoring shall concrete in beams, slab, columns or any other structural member be subjected to combined dead and construction loads in excess of the load permitted by the Engineer for the developed concrete strength at the time of reshoring.

Reshores shall be placed as soon as practicable after stripping operations are complete but in no case later than the end of working day on which stripping occurs.

Reshores shall be tightened to carry their required loads without overstressing the construction. Reshores shall remain in place at least until tests representative of the concrete being supported have reached the specified strength.

5.27 Floors supporting props or shores under newly placed concrete shall have their original supporting props or shores left in place or shall be reshored. The reshoring system shall have a capacity sufficient to resist the anticipated loads and in all cases shall have a capacity equal to at least one half the capacity of the shoring system above. The reshores shall be located directly under a shore position above unless other locations are permitted.

The reshoring or re-propping shall extend over a sufficient number of storeys to distribute the weight of newly placed concrete, forms and live loads in such a manner that the design superimposed loads of the floors supporting shores or props are not exceeded.

5.28 It is generally desirable to give forms for reinforced concrete an upward camber to ensure that the beams or slabs (specially cantilever slabs) do not have a sag when they have taken up their deflection, but this should not be done unless permitted by the Engineer.

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5.29 No loads, other than man and light plant required in connection with the actual work in hand, shall be allowed on suspended floors until 28 days after concreting where ordinary Portland Cement is used and 14 days when rapid hardening Portland Cement is used.

5.30 Prior to placing concrete, all forms shall be inspected and all debris and extraneous matter removed. The form oil or release agent shall not react with concrete to affect the strength nor shall it give any colour. It shall be applied in such a manner as not to contaminate the reinforcement and other fixtures to be embedded in concrete.

6.0 MEASUREMENT AND PAYMENT

Except otherwise specified in the Bill of Quantities no payment will be made for the works involved within the scope of this section of the specifications.

The cost thereof shall be deemed to have been included in the quoted unit rate of relevant concrete items of the Bills of Quantities.

*** End of Section 2100 ***

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SECTION - 2200

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

PS: 2031	Metallic Materials – Bent Test
P.S 607	Steel and Steel Product - General technical delivery requirement for steel.
PS 1879	Deformed and Plain Billet Steel Bars for the concrete Reinforcement.
PS 1612	Steel for the reinforcement of concrete – weldable reinforcement.

British Standard

B.S 4449	Specifications for Carbon steel bars for reinforcement of concrete
B.S 8666	Specifications for Scheduling, dimensioning, Bending and Cutting of Steel reinforcement for concrete.

ASTM Standard

A 706	Standard Specification for Low-Alloy Steel Deformed and Plain Bars for Concrete Reinforcement
A 615	Standard specification for deformed and plain Carbon-Steel bars for concrete reinforcement.
A1064	Standard Specification for Carbon –Steel wire and welded wire reinforcement, plain and deformed, for concrete.

ACI Codes

ACI 315	Details and Detailing of Concrete Reinforcement (ACI Publication SP-66)
ACI 318	Building Code Requirements for Structural 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.

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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.

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 A706 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 shall not exceed 78,000 psi (540 MPa). The Ratio of actual tensile strength to actual yield strength shall not be less than 1.25.

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 certificates of compliance from the manufacturer 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. If the results 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.

5.0 DELIVERY & STORAGE

5.1 Delivery

Steel reinforcement bars shall be kept in bundles firmly secured and tagged. Each bar or bundle of bars shall be identified by marks as per relevant ASTM standard.

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

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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 & 117.

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.

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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 providing, furnishing, cutting, bending, binding, welding, placing of reinforcing bars, anchors or inserts (ASTM A-706, Grade 60 deformed hot rolled billet steel bars), complete in all respects as specified and directed by the Engineer including all labor, material, equipment, tools or any incidental items required to complete the work satisfactorily shall be made by weight in metric tonne 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 tonne quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

8.3 Anchorage with Epoxy Chemical

8.3.1 Measurement

Measurement for acceptably completed works of Anchorage with epoxy chemical anchor as mentioned in Bill of Quantities including drilling of holes in existing structures, fixing and fixing accessories complete in all respect as shown on the Drawings and Bill of Quantities or as directed by the Engineer shall be made on the basis of actual chemical use in litre as approved by the Engineer.

8.3.2 Payment

Payment will be made for acceptable measured quantity of epoxy used for installation of supplemental reinforcement and shear connectors on the basis of unit rate per litre quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item. (This excludes the cost of anchor reinforcement and

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shear connector, which shall be paid under point 8.2.2 of this specification in tonnage.)

8.4 **Anti-corrosion Primer**

8.4.1 Measurement

Measurement of acceptably completed works of supply and application of anti-corrosion primer to cleaned and prepared reinforcement bars, in accordance with the manufacturer's recommendations etc.; will be made on the basis of actual liter of primer used complete as shown on drawings or as directed by the Engineer.

8.4.2 Payment

Payment will be made for acceptable measured quantity of anti-corrosion primer on the basis of unit rate per liter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

*** End of Section 2200 ***

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SECTION - 2300

PLAIN AND REINFORCED CONCRETE

1. GENERAL

1.1 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 on 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.

1.2 Applicable Codes and Standards

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

1.2.1 American Concrete Institute (ACI)

- 117 Standard Specification for Tolerances for Concrete Construction and Materials.

- 201.2 Guide to Durable Concrete

- 211.1 Standard Practice for Selecting Proportions for Normal, Heavy Weight and Mass Concrete.

- 214 Evaluation of Strength Test Results of Concrete.

- 301 Specifications for Structural Concrete .

- 303.1 Standard Specification for Cast -In-Place, Architectural Concrete

- 304R Guide for Measuring, Mixing, Transporting, and Placing Concrete

- 305 Hot Weather Concreting

- 308 Guide to Curing Concrete

- 309 Guide for Consolidation of Concrete

- 315 Details and Detailing of Concrete Reinforcement .

351.1R Grouting between Foundation and Bases for Support of Equipment & Machinery.

- 318 Building Code Requirements for Structural Concrete

- 347 Guide to Formwork for Concrete.

- 350R Code Requirment for Environmental Engineering Concrete Structures and Commentary.

- 544.1R State-of-the-Art Report on Fiber Reinforced Concrete

- 544.2R Measurement of Properties of Fiber Reinforced Concrete

- SP-2 ACI Manual of Concrete Inspection (ACI 311.1R)

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- SP-142 Fiber Reinforced Concrete Developments and Innovation
- SP-155 Testing of Fiber Reinforced Concrete
- SP-182 Structural Applications of Fiber Reinforced Concrete

1.2.2 American Society for Testing and Materials (ASTM)

- A499 Hot-Rolled Rail Carbon Steel Bars and Shapes
- A615/ A615M Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement
- A675 Steel Bars and Bar Size Shapes, Carbon, Hot-Rolled, Special Quality, Subject to Mechanical Property Requirements
- A996/ A996M Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement
- A1064/ A1064M Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
- C 31 Standard Practice for Making and Curing Concrete Test Specimens in the Field
- C 33 Standard Practice for Concrete Aggregates
- C 39 Standard Practice for Compressive Strength of Cylindrical Concrete Specimens
- C 40 Standard Practice for Organic impurities in Fine Aggregate for concrete.
- C 42 Standard Practice for Obtaining and Testing Drilled Cores and Sawed Beams of Concrete
- C 78 Standard Practice for Flexural Strength of Concrete (Using Simple Beam with Third Point Loading)
- C 87 Standard Practice for Effect of Organic Impurities in Fine Aggregates on Strength of Mortar.
- C 88 Standard Practice for Soundness of Aggregates by use of sodium sulphate and magnesium sulphate
- C 94 Standard Practice for Ready-Mixed Concrete
- C 109 Standard Practice for Compressive Strength of Hydraulic Cement Mortars (using 2 in or (50mm) cube specimen.
- C 117 Standard Practice for Materials Finer than No.200 Sieve in Mineral Aggregates by Washing.
- C 123 Standard Practice for Light weight particles in aggregates
- C 125 Standard Terminology Relating to Concrete and Concrete Aggregates
- C 127 Standard Terminology Relating to Test Method for Specific Gravity and Absorption of Coarse Aggregate
- C 128 Standard Terminology Relating to Test Method for Specific Gravity and Absorption of Fine Aggregate

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- C 131 Standard Terminology Relating to Resistance to Degradation of Small Size Aggregate by Abrasion of Small Size Coarse Aggregate by Use of the Los Angeles Machine

- C 136 Standard Terminology Relating to Sieve Analysis of Fine and Coarse Aggregates

- C 138 Standard Terminology Relating to Unit Weight, Yield, and Air Content (Gravimetric) of Concrete

- C 142 Standard Terminology Relating to Clay Lumps and Friable Particles in Aggregates

- C 143 Standard Terminology Relating to Slump of Hydraulic Cement Concrete

- C 144 Standard Specification for Aggregate for Masonry Mortar

- C 150 Standard Specification for Portland Cement

- C 156 Standard Specification for Test Method for Water Loss (From a Mortar Speciment) through Liquid Membrance – Forming Curing compound for concrete.

- C 157 Standard Specification for Length Change of Hardened Hydraulic Cement Mortar and Concrete

- C 171 Standard Specification for Sheet Materials for Curing Concrete

- C 172 Standard Specification for Sampling Fresh Mixed Concrete

- C 173 Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method

- C 185 Standard Test Method for Air Content of Hydraulic Cement Mortar

- C 186 Standard Test Method for Heat of Hydration of Hydraulic Cement

- C 188 Standard Test Method for Density of Hydraulic Cement

- C 191 Standard Test Method for Time of Setting of Hydraulic Cement by Vicat Needle

- C 217 Standard Test Method for Weather resistance of Natural Slate

- C 227 Standard Test Method for Potential Alkali Reactivity of Cement - Aggregate Combination.

- C 231 Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method

- C 260 Standard Test Method for Air-Entraining Admixtures for Concrete

- C 289 Standard Test Method for Potential alkali-silica reactivity of Aggregates

- C 293 Standard test method for Flexural Strength of Concrete (using simple beam with center Point Loading)

- C 309 Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete

- C 321 Standard Test method for Bond Strength of Chemical Resistant Mortars.

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- C 330 Standard Specification for Light Aggregates for Structural Concrete

- C 332 Standard Specification for Light weight Aggregates for Insulating Concrete.

- C 348Standard Test method for Flexural strength of Hydraulic Cement Mortars

- C 494 Standard Specification for Chemical Admixtures for Concrete

- C 535 Standard Specification to Degradationof Large Size Coarse Aggregates by Abrasion and Impact in Los Angeles Machine.

- C 595 Standard Specification for Blended Hydraulic Cements

- C 596 Standard Test method for Drying, shrinkage of Mortar Containing Hydraulic Cement

- C 685 Standard Specification for Concrete Made by Volumetric Batching and Continuous Mixing

- C 881 Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete

- C 989 Standard Specification for Ground Granulated Blast – Furnace Slag for use in Concrete and Mortars.

- C1602 Standard Mixing Water Used in the Production of Hydraulic Cement Concrete

- C 1399 Test Method for Obtaining Average Residual-Strength of Fiber-Reinforced Concrete

- D 75 Standard Practice for Sampling Aggregates

- D 512 Standard Practice for Chloride Ion in Water and Waste Water

- D 516 Standard Practice for Sulphate Ion in Water and Waste Water

- D 596 Standard Practice for Reporting Results of Analysis of Water

-D 6690 Standard Specifications for Joint and Crack Sealant, Hot applied for Concrete and Asphalt Pavements.

- D 1411 Standard Test Method for Water-Soluble Chlorides Present as Admixes in Graded Aggregate Road Mixes

- D 1751 Standard Specifications for Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)

- D 1752 Standard Specifications for Preformed sponge Rubber and Cork Expansion Joint Fillers for Concrete Paving and Structural Concrete

-- E 11 Standard Specifications for Woven Wire-Cloth Sieves for Test sieve

- E 96 Standard Test Method for Water Vapour Transmission of Materials

- E 154 Standard Test Method for Water Vapors Retarders used in Contract with Earth under concrete Slab on walls or As Ground Covers.

- E 337 Standard Test Method for measuring Humidity with Phychrometer (Measurement of wet and Dry Bulb Temperature)

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- CALIF 217 Method of Test for Sand Equivalent

- CALIF 227 Method of Test for Evaluating Cleanness of Coarse Aggregate

1.2.3 CRD US Army Corps of Engineers

- COE CRD C 119 Method of Test for Flat and Elongated Particles in Coarse Aggregate

-COE CRD C400 Requirements for Water for Use in Mixing and Curing Concrete

- COE CRD C 513 Handbook for Concrete and Cement Corps of Engineers Specifications for Rubber Waterstops

- COE CRD C 572 Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinyl Chloride Waterstops

- FF MM G 650 Epoxy-Resin Grout

1.2.4 British Standard (BS)

- BS EN 197-1 Cement composition, Specification and Conformity criteria for Common Cement.

-BS EN 932-6 Tst for General Properties of Aggregates Definition of Repeatability and Reproducibility

-BS ISO 3310-2 Test sieved Technical Requirement and Testing. Test Sieves of Perforated Metal Plate.

-BS EN 1008 Mixing water for Concrete. Specifications for sampling , Testing, and Assesssing the suitablitiy of water, including water recovered from processes in Concrete industry as mixing water for concrete

-BS EN 1992-1 Desgin of Concrete Structures . General Rules and Rules for Buildings.

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

The Contractor shall submit proposed designs for trial design batches for each grade of concrete along with samples of proposed material.

The Contractor shall submit proposed final mix designs for each grade of concrete at least 28 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) Contractor's construction procedures including description, 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.

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(b) 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.
(c) Construction Activity Schedule.
(d) Sequence of Construction
(e) Pouring Plans along with location of construction joints.
(f) Detailed methodology and procedure for dismantling, rehabilitation, renovation and extension works.
(g) Shop drawings and coordination drawings.
(h) Design calculations and scheme of temporary works including shoring, propping and formworks etc. along with drawings/sketches.
(i) Protection of concrete against injury due to mechanical contact and other construction operations.
(j) 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:

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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.

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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 co-ordination, 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 or type of Cement as shown on the drawings and/or BoQ.

a) Modified Ordinary Portland Cement complying with the requirements of ASTM C -150 and meeting the following limits shall be used
C_3A SHALL NOT BE LESS THAN 5% NOR MORE THAN 8%
$C_4AF + 2C_3A$ SHALL BE LESS THAN OR EQUAL TO 25%
Al_2O_3 SHALL BE LESS THAN OR EQUAL TO 6%

b) Ordinary Portland Cement Type II (low alkali) complying with the requirements of ASTM C-150.

c) Sulphate Resistant Portland Cement (low alkali) complying with the requirements of ASTM C-150 (Type V).

d) Ordinary Portland Cement Type III High Early Strength Cement (Rapid Hardening) complying with the requirements of BS EN197-1 or ASTM C-150.

e) Portland Blast–Furnace Slag Cement shall conform to BS-EN 197-1 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.

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4.1.2 Cement shall be tested and allowed to use after receiving satisfactory test reports from reputable laboratory.

4.1.3 Unless otherwise specified, Modified Ordinary Portland Cement complying with the requirements of ASTM C150 and meeting the above given limits shall be used.

4.1.4 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.

4.1.5 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.

4.1.6 There shall be sufficient cement at site to ensure that each section of work is completed without interruption.

4.1.7 Cement reclaimed from cleaning of bags or from leaky containers shall not be used.

4.1.8 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. Storage shall be done in a manner that cement bags stored first shall be used first and only then the next batch of cement shall be used.

4.1.9 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.

4.1.10 Low Alkali cements shall only be used for manufacturing of concrete. Only cements, containing less than 0.6% equivalent alkali or cements that can demonstrate a positive reduction in the expansion created by alkali-silica reactions shall be used. Total Alkalis (Na2O & K2O) of the cement secured for the production of concrete shall be verified in accordance with ASTM C 114.

4.1.11 Mixing together of different type and brand 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

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

When tested as per BS EN 933, 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 no 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 graduation requirements.

Aggregates shall be tested for deleterious reactivity with alkalis in the cement, which may cause excessive expansion of the concrete. Tests of coarse and fine aggregates shall be made in accordance with ASTM C 1260. If the expansion of the coarse and/or fine aggregates test specimen, tested in accordance with the ASTM C 1260, does not exceed 0.10% at 16 days from casting, then the coarse and fine aggregates shall be accepted.

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 the Engineer's review and approval.

The Contractor shall furnish certified test reports for aggregate tests listed in Table-III, Quality Tests.

4.3 Water

Only potable water from the sources approved by the Engineer shall be used. The Contractor shall supply sufficient water for all purposes, including mixing the concrete,

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curing and cleaning plant and tools. Performance requirements for mixing water shall conform to ASTM C1602 or BS BS3148.

In case of doubt, the Engineer will 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 1, Grade C.

4.5 Fibre Reinforced Concrete

Concrete shall be treated with polypropylene synthetic reinforcing fibers (Duracrete 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 be1.8 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: 58,000 psi (minimum)
2. Elongation at break: 12% (minimum)
3. Fiber: 100% Fibrillated / Monofilament Polypropylene (as per site requirement)
4. Lengths: As per requirement/drawings
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.

Poly Carboxylate Ether (PCE) based third generation superplasticizer conform to ASTM C 494. (Sika Viscocrete – 58HT-PK or Approved Equivalent.

Silica Fume as a supplementary additive conforming to ASTM C1240. Dosage shall be as per mix design and as approved by the Engineer

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Fly ash as a supplementary additive conforming to ASTM C618. Dosage shall be as per mix design and as approved by the Engineer

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

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 0.5per meter as determined by ASTME96, 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: "SikaGrout 713" manufactured by Sika, "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 Waterproofing Admixture

Crystalline waterproofing admixture (Betocrete C-16 by Schomburg, Germany or approved equivalent) as specified in drawings.

4.10 Corrosion Inhibiting Admixture

Migrating Corrosion Inhibiting admixture (MCI 2005 by Cortec Corporation or Approved Equivalent) shall be used for reinforced concrete works as specified in the drawings and BOQ. Preparation and proportions shall be according to the manufacture's recommendations and ACI 212. The migrating corrosion inhibitor should be organic amine-carboxylate based and applied at a fixed low dosage rate according to ACI 212 and as per manufacturer recommendations, and should have the following qualities:

i. Meet the requirements of ASTM C1582 when tested as per ASTM G109 from 3rd party independent accredited lab and shall meet or exceed the requirements of ASTM C1582.
ii. Must meet the requirements of BS 8443
iii. Be proven effective when tested in accordance to ASTM G109 for a testing period not less than 3 years and proven effective in modified cracked beam testing.
iv. Protect both anodic and cathodic components of the corrosion cell.
v. The manufacturer shall be ISO 9001 and ISO 14001 certified for the design and manufacturing of corrosion protection systems and concrete protection products with valid certificate.

The contractor must submit a certificate of supply for each and every concrete pour with corrosion inhibitor and must mention the following:

i. Batch numbers and expiry dates of the material

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ii. Company Stamp and its authorized representative signature

4.11 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^2.

c) Standard Specification for Liquid Membrane Forming Compound: ASTM C309, Type 2.

4.12 Joint Fillers

ASTM D 1751, preformed, Non- Extruding and resilient bituminous type or ASTM D1752, preformed sponge rubber cork.

4.13 Joint Sealants

(i) Polysulphide sealant gun grade or pour grade conforming to ASTM C920 as specified in the drawings.
(ii) Polyurathane sealant gun grade or pour grade conforming to ASTM C920 as specified in the drawings.

(iii) Elastomeric Jet fuel resistant type sealant conforming to ASTM D7116 as specified in the drawings

4.14 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) water stops complying with US Corps of Engineers Specification CRD-C-572 or ASTM D-412 or ASTM D-638 of approved manufacturer.

4.15 Epoxy Resin

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

4.16 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

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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. Dowels shall be protected from damage during removal of forms and subsequently from traffic until concrete for adjacent panels are cast.

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.

4.17 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 found satisfactory by 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. The water shall conform to ASTM C1602 or BS3148. Any change in source of water shall be intimated to the Engineer and specified testing shall be done as directed by the Engineer.

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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 ASTMC39 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, concrete cores shall be obtained through drilling and tested in conformance with ASTM C-42 at the Contractor's expense. 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.

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- *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.

- The following tests shall be performed at the discharge point for each truck load of concrete delivered or at delivery point, as determined by the Engineer.
  a) Slump ASTM C 143
  b) Air Content ASTM C 173 or C 231

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 Table1.

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 ASTMC143. 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:

Class of Concrete	Specified Cylinder Compressive Strength at 28 days (MPa)
A2	40.0
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.

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6.2.1 The Contractor shall adopt all necessary measures as per ACI201.2, 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 ASTMC-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 ASTMC-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.

6.2.3 For determining Coefficient of Thermal Expansion of Concrete, four (4) test specimens shall be fabricated from a single batch of concrete to be tested as per AASHTO T 336 initially for field qualification and during regular production of each type of concrete, similar number of specimen shall be produced and tested for determining Coefficient of Thermal Expansion of Concrete for every 1000 Cu.m of concrete.

6.2.4 The coefficient of thermal expansion must not exceed 6.0 micro strain / °F. During production, test the coefficient of thermal expansion of the concrete at a frequency of 1 test for each 1,000 Cu.m of paving or concrete pouring but not less than 1 test for a project with less than 1,000 Cu.m of concrete.

7.0 BATCHING, MIXING AND DELIVERY

7.1 Batching

7.3.1 All cement, including cement supplied in bulk, shall be batched by weight. A bag of cement may be taken as 50 kg.

7.3.2 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.

7.3.3 The quantity of additives shall be as prescribed by the manufacturer or as directed by the Engineer.

7.2 Mixing

7.2.1 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.

7.2.2 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.

7.2.3 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.

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7.2.4 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.

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

7.3 Transporting

7.3.1 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.

7.3.2 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 +1.0 percent of the desired intermediate and final weights in cumulative batchers. The minimum batching accuracy shall be +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 ±2.0 percent of the desired weight, or within ±1.0 percent of the desired intermediate and final weights in cumulative batchers; but in either case, the minimum batching accuracy shall be ±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 ±1.0 percent of the desired amount.

Liquid admixtures measured by volume or by weight shall be within ±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,

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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.

7.4 Concrete for Pavement

7.4.1 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 and de-bonding of cement treated base course from concrete pavement, polyethylene sheet 0.2mm thick as vapour barrier, as per drawings and relevant section of specifications shall be placed on cement treated base coarse, prior to placing of concrete.

Air entraining admixture shall be added in such a manner that will ensure uniform distribution of the agent throughout the batch. The air content of freshly mixed air –entrained concrete shall be based upon trial mixes with the materials to be used in the work adjusted to produce concrete of the required plasticity and workability. The percentage of air in the mix shall be 4.5%. Air content shall be determined by testing in accordance with ASTM C 231.

7.4.2 Slip-Form Construction

The concrete shall be distributed uniformly into final position by a self propelled slip-form paver without delay. The alignment and elevation of the paver shall be regulated from outside reference lines established for this purpose. The paver shall vibrate the concrete for the full width and depth of the strip of pavement being placed and the vibration shall be adequate to provide a consistency of concrete that will stand normal to the surface with sharp well defined edges. The sliding forms shall be rigidly held together laterally to prevent spreading of the forms.

The plastic concrete shall be effectively consolidated by internal vibration with transverse vibrating units for the full width of the pavement and/or a series of equally placed longitudinal vibrating units. The space from the outer edge of the pavement to longitudinal unit shall not exceed 225 mm. The spacing of internal units shall be uniform and shall not exceed 450 mm.

The term internal vibration means vibrating units located within the specified thickness of pavement section.

The rate of vibration of each vibrating unit shall be within 8000 to 12000 cycles per minute and the amplitude of vibration shall be sufficient to be perceptible on the surface of the concrete along the entire length of the vibrating unit and for a distance of at least 300 mm. The frequency of vibration or amplitude shall vary proportionately with the rate of travel to result in a uniform density and air content. The paving machine shall be equipped with a tachometer or other suitable device for measuring and indicating the actual frequency of vibrations.

The concrete shall be held at a uniform consistency. The slip-form paver shall be operated with as nearly a continuous forward movement as possible. And all operations of mixing, delivering, and spreading concrete shall be coordinated to provide uniform progress with stopping and starting of the paver held to a minimum. If for any reason, it is necessary to stop the forward movement of the

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paver, the vibratory and tamping elements shall also be stopped immediately. No tractive force shall be applied to the machine, except that which is controlled from the machine.

When concrete is being placed adjacent to an existing pavement, that part of the equipment which is supported on the existing pavement shall be equipped with protective pads on crawler tracks or rubber-tired wheels on which the bearing surface is offset to run a sufficient distance from the edge of the pavement to avoid breaking the pavement edge.

7.4.3 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.

7.4.4 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.

7.4.5 Placing Concrete

a) General

The concrete shall be deposited on the base course in successive batches for the full width between forms or infront of the slip form paver 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

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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 finisher or 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 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.

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7.4.6 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 material specified in para 6.6.12a of these specifications.

The entire joint assembly shall be of a type designated on the drawings 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.

For concrete poured within the forms, when 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.

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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.

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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.

7.4.7 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 sub-section 7.2.4. 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 or a finishing screed of the slip form paver. 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

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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 an guided by a rigid frame or part o slip form paver. 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.

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7.4.8 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.

Burlap Drag Finish: If a burlap drag is used to texture the pavement surface, it shall be at least 555 gm/Sq.m. To obtain a rough-textured surface, the transverse threads of the burlap shall be removed approximately 300mm from the trailing edge. A heavy buildup of grout on the burlap threads produces the desired wide sweeping longitudinal striations on the pavement surface. The corrugations shall be uniform in appearance and approximately 2mm in depth.

7.4.9 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.

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 continuous 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.

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Groove tolerance.
Minimum depth 3 mm.
Maximum depth 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.

7.4.10 Surface Test

As soon as the concrete has hardened sufficiently, the pavement surface shall be tested with a 5 m straight edge, rolling straight edge, or other specified device as approved by the Engnieer 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.

7.4.11 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 for 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.

7.4.12 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 (3-2/3) 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.

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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 (2-1/2) 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.

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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 ASTM C171 or 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.

7.4.13 Sealing Joints

a) Materials

Joint sealant shall be hot-poured elastic type compound, fuel-resistant complying with ASTM D3569 for airfield pavements constructed with pavement quality concrete and ASTM D3405 or ASTM D0090 for other pavements and at the joint formed between flexible and rigid 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 and before proceeding with cleaning operation all joints shall be inspected for any damage or absence of 6mm radius bend at the corner of the joint.

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.

7.4.14 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

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(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.

7.4.15 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.

7.4.16 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. Contractor shall provide rolling straight edge with / without recording arrangements, if so required by the Engineer without any extra financial implication

7.4.17 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.

7.5 Embedded Items

7.5.1 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.

7.5.2 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

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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.

7.5.3 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.

7.5.4 Expansion joint material, waterstops 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.

7.5.5 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				
	Coarse		Fine		
Particle Size Square Openings (Equivalent U.S. Sieve Designation)	19 mm to 5 mm	25 mm to 5 mm	37.5 mm to 19 mm	50 m to 25 mm	(Sand)
	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	90 – 100	-
37.5 mm (1 1/2 in.)	-	100	90 - 100	35 – 70	-

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25.0 mm (1 in.)	100	95 - 100	20 - 55	0 - 15	-
9.0 mm (3/4 in.)	90 –100	-	0 - 15	-	-
12.5 mm (1/2 in.)	-	25 - 60	-	0 - 5	-
09.5 mm (3/8 in.)	20 - 55	-	0 - 5	-	100
05.0 mm (No.4)	0 - 10	0 - 10	-	-	95-100
2.36 mm (No. 8)	0 - 5	0 - 5	-	-	80-100
1.18 mm (No. 16)	-	-	-	-	50 - 65
0.60 mm (No. 30)	-	-	-	-	25 - 60
0.30 mm (No. 50)	-	-	-	-	5 - 30
0.15 mm (No. 100)	-	-	-	-	0 - 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	-
12.5 mm (1/2 in.)	-	-	-	-	100
09.5 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	1 - 5
0.075 mm (No. 200)	0 - 2	0 - 2	0 - 2	0 - 2	0 - 2

TABLE III : Quality Tests For Aggregates

Material	Test	Requirement	Test Designation
Coarse	Abrasion	Loss 40% max.	ASTM C 131

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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

7.6 Concrete for Structures

7.6.1 Placing

7.6.1.1 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.

7.6.1.2 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.

7.6.1.3 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.

7.6.1.4 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.

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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.

7.6.1.5 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.

7.6.1.6 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.

7.6.1.7 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.

7.6.2 Consolidation

7.6.2.1 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.

7.6.2.2 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.

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

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

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

7.6.3 Curing and Protection

7.6.3.1 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.

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7.6.3.2 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.

7.6.3.3 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.

7.6.3.4 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 works 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.

7.6.3.5 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.

7.6.3.6 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.

7.6.3.7 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^{O}F) in any one hour or 10°C (30°F) in any 24 hour period.

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

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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.

7.6.4 Works in Extreme Weather

7.6.4.1 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.

7.6.4.2 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^{o}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 of 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).

7.6.4.3 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.

7.6.5 Construction Joints

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

7.6.5.2 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

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the same time as slabs. Joints shall be placed at the same time as slabs. Joints shall be perpendicular to the main reinforcement.

7.6.5.3 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.

7.6.5.4 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.

7.6.5.5 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.

7.6.5.6 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.

7.6.5.7 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.

7.6.5.8 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.

7.6.6 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.

7.6.7 Embedded Items

7.6.7.1 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.

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7.6.7.2 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.

8.0 FINISHING OF FORMED SURFACES

8.1 General

8.1.1 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.

8.1.2 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.

8.1.3 Allowable deviations from plumb or level and from the alignment, profile grades, and dimensions are specified in Clause 10. 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.

8.2 As-cast Finishes

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

8.2.1 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.

8.2.2 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 8.2.1, '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

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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.

9.0 REPAIR OF DEFECTS

9.1 General

9.1.1 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.

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

9.2 Repair of Defective Areas

9.2.1 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.

9.2.2 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.

9.2.3 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.

9.2.4 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 loose 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 7days. Metal tools shall not be used in finishing a patch in a formed wall, which will be exposed.

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9.2.5 Where as-cast finishes are specified, the quantity of patched area shall be strictly limited. The combined total of patched areas in as-cast surfaces shall not exceed 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.

9.2.6 Any patches in as-cast architectural concrete shall be indistinguishable from surrounding surfaces. The mix formula for patching mortar shall be determined by trail 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.

9.2.7 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.

9.3 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.

9.4 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.

10.0 CONCRETE CONSTRUCTION TOLERANCES

All tolerances shall be as per ACI 117.

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.

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

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

In any 3 metres (10') of length or height	6 mm (1/4")
Maximum for the entire length or height	25 mm (1")

10.1.2 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")

10.2 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")

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

10.3 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')	± 13 mm	(± ½")
Maximum for the entire length	± 25 mm	(± 1")

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

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

10.5 Footings

10.5.1	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")
10.5.2	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	(+2")
10.5.3	Reduction in thickness		
	Minus 5 percent of specified thickness	- 5%	

11.0 ACCEPTANCE OF STRUCTURE

11.1 General

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

11.1.2 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.

11.1.3 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.

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11.2 Dimensional Tolerances

11.2.1 Formed surfaces resulting in concrete outlines smaller than permitted by the tolerances of clause 10 shall be considered potentially deficient in strength and subject to the provisions of sub clause 11.4.

11.2.2 Formed surfaces resulting in concrete outlines larger than permitted by the tolerances of clause 10 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.

11.2.3 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.

11.2.4 Inaccurately formed concrete surfaces exceeding the limits of Clause 10 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.

11.3 Appearance

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

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

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

11.4 Strength of Structure

11.4.1 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.

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

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

11.4.4 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.

11.4.5 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.

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

12.0 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 items of the Bill of Quantities.

12.1.1 All types of formwork.

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

12.1.3 All sampling, mixing and testing as specified.

12.1.4 Concrete mix design.

12.1.5 Vapour barrier.

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

12.1.7 Anchor bolts and other embedded parts.

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

12.1.9 Repair and replacement of defective work.

12.1.10 Surface texture, skid resistant surfaces & surface test.

12.1.11 Curing

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

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

12.1.14 Providing and laying Duracrete fiber or equivalent as specified.

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12.2 Repair of Deteriorated Beams/ Transom

12.2.1 Measurement

Measurement of acceptably completed works of SCC (Self-Consolidating Reinforced Cement Concrete with reduced-size aggregate as per General Notes and Drawings), using specified cement, including PCE-based third-generation superplasticizer and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture mixed in concrete as per manufacturer's specifications; to be pumped in a water tight formwork etc.; complete in all respects as shown on the drawings and as directed by the Engineer; will be made on the basis of actual volume of cubic meters of concrete actually provided, placed, consolidated, finished, cured in position, complete as shown on drawings or as directed by the Engineer.

12.2.2 Payment

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

12.3 Patch Repair of Deteriorated Slab/ Plank/ Deck

12.3.1 Measurement

Measurement of acceptably completed works of Patch Repairs of deteriorated Slab/ Plank/ Deck with cementitious shrinkage compensated structural repair mortar. Before application of repair mortar, a bonding agent shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing furnishing all materials, labour, equipment, tools and any identical work will be made on the basis of actual volume of cubic meters of repair works of slab/ plank/ deck actually provided, placed, consolidated, finished, cured in position, complete as shown on drawings or as directed by the Engineer.

12.3.2 Payment

Payment will be made for acceptable measured quantity of patched repaired of deteriorated Slab/ Plank/ Deck on the basis of unit rate per cubic meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

12.4 Patch Repair of deteriorated Pile Head/ Concrete Surfaces/ Transom/ Plank/Slab

12.4.1 Measurement

Measurement of acceptably completed works of Patch Repairs of deteriorated Pile Head/Concrete Surfaces/ Transom/ Plank/ Slab with cementitious shrinkage compensated structural repair mortar. Before application of repair mortar, a bonding agent shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work will be made on the basis of actual volume of cubic meters of patch repaired.

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12.4.2 Payment

Payment will be made for acceptable measured quantity of patch repaired of deteriorated Pile Head/ transom/ concrete surface on the basis of unit rate per cubic meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

12.5 Water Repellant

12.5.1 Measurement

Measurement of acceptably completed works of Sealing of concrete surfaces by providing, furnishing and application of saline-based water repellent coating on the specified areas as per manufacturer's specifications and all as directed and approved by the Engineer including surface preparation, performance tests and all materials, labor, equipment, tools etc. necessary to complete the work satisfactorily will be made on the basis of actual area in square meter of water repellant used complete as shown on drawings or as directed by the Engineer.

12.5.2 Payment

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

12.6 Reinforced Concrete for Slab

12.6.1 Measurement

Measurement of acceptably completed works of Reinforced Cement Concrete, using specified cement, including PCE-based third-generation superplasticizer and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture mixed in concrete as per manufacturer's specifications etc.; complete in all respects as shown on the drawings and Bill of Quantities will be made on the basis of volume of cubic meters of concrete actually provided, placed, consolidated, finished, cured in position, as directed by the Engineer.

12.6.2 Payment

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

12.7 Launching of Planks

12.7.1 Measurement

Measurement of acceptably completed works of Launching of planks etc.; by approved means over land, water, including all temporary works, etc., complete in all respects as per drawings and as mentioned in Bill of Quantities; will be made on the basis of actual weight in tonne of planks as directed by the Engineer.

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12.7.2 Payment

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

12.8 Precast Planks

12.8.1 Measurement

Measurement of acceptably completed works of Precast Reinforced Cement Concrete, using specified cement, including PCE-based third-generation superplasticizer and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture mixed in concrete as per manufacturer's specifications etc.; complete in all respects as shown on the drawings and Bill of Quantities; will be made on the basis of actual volume in cubic meter of precast planks as directed by the Engineer.

12.8.2 Payment

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

12.9 Preparation for Injection

12.9.1 Measurement

Preparing for injection of Resin to cracks in concrete surfaces of structures including drilled packers, plugging and re-working after injection e.g. filling of holes with repair mortor and finish etc. complete in all respects.

12.9.2 Payment

This item is for rate only. Payment will be made for acceptable measured quantity of preparing for injection of Resin to cracks in concrete surfaces of structures 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.

12.10 Supply & Injection

12.10.1 Measurement

Supply, mixing and injection of resin product including all associated works. complete in all respects and as mentioned in bill of quantities and as directed by the Engineer.

12.10.2 Payment

This item is for rate only. Payment will be made for acceptable supply, mixing and injection of resin product on the basis of liters provided as quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

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12.11 Slab

12.11.1 Measurement

Measurement of acceptably completed works of Reinforced Cement Concrete, using specified cement, including PCE-based third-generation superplasticizer and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture mixed in concrete as per manufacturer's specifications etc.; complete in all respects as shown on the drawings and as directed by the Engineer will be made on the basis of actual volume in cubic meter of reinforced concrete as directed by the Engineer.

12.11.2 Payment

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

12.12 Bonding Agent

12.12.1 Measurement

Measurement of acceptably completed works for Supply and application of bonding agent on the old concrete surfaces and exposed steel reinforcement before application of top slab, in accordance with manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work will be made on the basis of actual area in square meter of bonding agent applied.

12.12.2 Payment

Payment will be made for acceptable measured quantity of bonding agent for old concrete surface 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.

*** End of Section 2300***

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SECTION 2315

EXPANSION JOINTS

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 and finishing expansion joint as shown in the drawings, as per manufacturer's recommendation as specified herein and as required by the site conditions or as directed by the Engineer, for a complete job.

2.0 GENERAL

Expansion joint furnished under this section of Specification shall be the standard products of a manufacturer regularly engaged in the production of such devices and shall be the manufacturer's latest design that complies with the specified requirements and as shown in the drawings. Contractor shall submit manufacturer's Data and Test Reports for approval from Engineer prior to procurement. In addition, detailed drawings and installation manual of the approved product shall also be submitted prior to installation.

3.0 PRODUCTS

3.1. Design Requirements

3.1.2 Expansion Control

a. Provide integrally molded units of neoprene and bonded steel components or rubber and bonded steel components, cast under pressure and heat, arranged to provide for the expansion and contraction movements of structures and having a wear-resistant surface.

b. Provide steel of sufficient strength to bridge the gap in the deck while supporting a wheel load of 94 kN over a contact area of 0.3X0.6m^2 with maximum plate deflection of 1/800 of the maximum opening when fully extended.

c. There shall not be a change in the surface configuration as a result of expansion and contraction movements.

d. Expansion and contraction movements shall be taken entirely by deformation of the neoprene or rubber.

e. Make other provisions as necessary to provide a weather-tight installation resistant to the penetration of debris.

f. Provide units which can be readily cut and fitted to gutter curb and upstand configurations.

g. Provide for joint movements perpendicular and parallel to the joint, as shown, and for ± 6mm vertical misalignment.

The parallel movement shall allow for at least 25% of the total perpendicular movement.

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h. Provide for locking or keying between seal units in each joint.

3.2 **Materials**

Materials, other than elastomers, should have a service life of not less than 75 yr. Elastomers for joint seals and troughs should provide a service life not less than 25 yr.

Elastomer:

A 'cellular' neoprene strip seal must be used, unless the skew of the bridge exceeds the maximum skew recommended by the manufacturer for this type of seal.

The preformed elastomeric seal for the joint must be made from vulcanized compound having polymerized chloroprene as the only base polymer. The thickness should not be below 4 mm.

Documentary evidence must be provided to the Engineer to verify that the elastomer used in the manufacture of the seal has been tested in a laboratory meeting the requirements ASTM D 5973.

The Contractor shall furnish to the Engineer a certification by the manufacturer that the elastomer conforms to the requirements of ASTM D 5973. The certification shall be supported by a certified copy of the results of tests performed by the manufacturer upon samples of the elastomer.

Anchorages:

Except for the system shown in the drawings or as otherwise approved by the Engineer, round bars used as anchorages must be at least 20 mm in diameter.

Rectangular bars used as anchorages must have a minimum thickness of 12 mm.

Stud welded shear connectors used as anchors must be at least 20 mm diameter and 200 mm in length and welded to the steel retainer only by resistance welding using a welding gun. Stud shear connectors must not be welded to aluminum seal retainers.

Seal Retainers:

The metal seal retainers for the joint must be manufactured from steel or aluminum as shown in the drawings.

The Contractor shall furnish to the Engineer a certification by the manufacturer that the steel conforms to the requirements of ASTM A36. The certification shall be supported by a certified copy of the results of tests performed by the manufacturer upon samples of the steel.

Where the tops of the seal retainers are at road level, any legs must be at least 12 mm thick unless otherwise specified in drawings.

Where seal retainers are concreted in position, horizontal legs must have air bleed holes of at least 12 mm diameter at not more than 600 mm centers.

Where any leg of a steel seal retainer is upright, welded stiffeners to the leg must be provided at no more than 300 mm spacing.

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Extruded aluminum seal retainers must have sufficient stiffness to not require stiffeners. Unless shown otherwise on the drawings, steel seal retainers must be hot dipped galvanized in accordance with ASTM A123

3.3 Warranty

The expansion joint must be supplied with a manufacturer's warranty in the name of the Engineer/ Client.

The warranty must:

a) cover defective workmanship, material and serviceability (which includes water tightness of the joint).

b) fully cover the replacement / rectification of a defective expansion joint; and

c) apply for a minimum period of 10 years from the date of installation.

3.4 Fabrication

Furnish the basic profile and operating units as shown in drawing. Select units comparable to those shown, or required, for the joint size and to absorb variations in adjacent surfaces and structural movement. Furnish the longest practicable lengths to minimize the number of end joints. Provide mitered corners where joints change direction or abut other material systems.

Reassemble items in the shop to the greatest extent possible to minimize field splicing and assembly of units. Disassemble units only to the extent necessary for shipping and handling limitations. Clearly match mark units for reassembly and coordinated installation.

4.0 EXECUTION

4.1 Inspection

Examine the areas in which, and conditions under which, expansion joint seals are to be installed. Do not proceed with the work until unsatisfactory conditions have been corrected.

4.2 Installation

Seal the joint to prevent intrusion of moisture and other contaminants.

Provide for anchoring by either bolts or studs forming a mechanical connection between components molded in the expansion joint seal and the structure.

Comply with manufacturer's written instructions and recommendation, including preparation of substrate, installations, and protection of installed units.

5.0 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 under mentioned items

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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.

5.1.1 Preparation of surface and sealing of joint.

5.1.2 Anchoring of joint with structure.

5.1.3 Protection of installed joint.

5.1.4 Concrete for filling the gap between slab and expansion joint.

5.1.5 Baker rod

5.2 **Expansion Joint**

5.2.1 Measurement

Measurement of acceptably completed works of floor expansion joints including embedding, embedded parts, fixing and all fixing accessories will be made on the basis of running metre of the expansion joint actually provided and fixed, as shown on the Drawings or as directed by the Engineer

5.2.2 Payment

This item is for rate only in running meter. If payment will be made for acceptable measured quantity of expansion joint on the basis of unit rate per running metre quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

*** End of Section 2315 ***

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SECTION - 2330

STRUCTURAL CONCRETE REPAIRS

1.0 SCOPE

The work under this section of the specification consists of furnishing all plant, labor, equipment and appliances in performing all operations in connection with the supply, manufacture, transporting, placing, consolidating, finishing structural concrete repairs 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.

The purpose and scope of concrete repair works is defined and described under section 0100. The Contractor shall conduct their own assessment for quantification of works and submit to the Engineer methodology and sequence of all repair works along with shop drawings in line with the given repair scheme. The contractor may carry out any field tests and investigations, if required, . Based on their investigations, the Contractor may prepare and submit the methodology of all the repair works along with shop drawings and test results of the investigations to the Engineer for his review and approval.

2.0 TEMPORARY WORKING PLATFORMS

The Contractor is responsible for the design of safe working platforms at all locations, including the safe access to these, considering the actual tidal water levels and the jetty operations. The design shall be suitable to carry personnel, equipment and materials to be used. Working platforms may be suspended from the deck slab or beams, or supported by by the piles of the jetty or supported on the sea bed, or through the barges as the case may be. However, any drilling of anchor holes, auxiliary supports, anchoring, mountings, welding, etc., as may be required by the Contractor to secure the working platforms in place will have to be treated after completion of the works, to the satisfaction of the Engineer. Detailed Drawings and design computations are to be submitted to the Engineer well in time before preparation of the materials and their installation. The design of these temporary structures shall consider different load conditions, including dead-weight, equipment, live loads, formwork loads etc. as well as loads from tide and waves.

3.0 TEMPORARY SUPPORT OF STRUCTURE

The Contractor is responsible for the design of all temporary construction measures required for temporary support of parts of the structure, during removal of defective concrete /dismantling works of substantial parts of structural members (for example substantial part of beam or transoms) which is likely to reduce the integrity and stability of the structure.

Detailed Drawings and design computations are to be submitted to the Engineer well in time. In case the Contractor requires using parts of the existing structure to support such temporary construction measures and the shoring of the structure, they will have to verify that the additional loads can safely be carried by the respective member. Auxiliary supports, anchoring, mountings, welding, etc., as may be required by the Contractor to secure the temporary measures in place have to be removed completely and made good subsequently, all to the satisfaction of the Engineer

4.0 PROGRAMMING OF WORKS

1. The execution of the concrete repair works shall be programmed in consideration of requirements of Section 0100 of the specifications.

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The facility may be kept in operation or any working may be conducted by any other contractor on top of the Unloading Jetty during the repair works. The works must be planned in accordance with the facility operations, working of the other contractors and this contract.

The repair of concrete structures must be planned in accordance with the tidal cycle and the contract assumes that every low tide phase is being utilized, except on holidays.

2. After removing the unsound concrete, placing any supplemental reinforcement, preservation of existing reinforcement, setting the watertight formwork and all subsequent work, i.e. final surface cleaning of exposed surfaces and final casting of the respective structural member, all work must be carried out and completed in low tide.

3. For repair program of this magnitude, the precise advanced definition of all repair measures and materials is almost impossible. Therefore, it is required that the Contractor maintains a range of approved materials and material grades at Site to ensure the required flexibility in application of different methods and measures and use of materials, to cope with the changing requirements during the repair works.

   The Contractor's own assessment and determination of repair methods and materials shall serve as the base for deciding on the range of products and materials to be kept available at Site, all subject to the consent of the Engineer.

5.0 EVALUATION OF DAMAGE AND FINAL DETERMINATION OF REPAIR METHODS

5.1 Contractor's Responsibility

Refer to Section 0100

5.2 Scope of Work

1. The general scope of works includes the inspection, removal of contaminated and unsound concrete, preparation, repair and protection of reinforced concrete.

   The contractor shall inspect the site and mark up a set of working drawings indicating the respective repair zones and which repair method(s) to use in the areas.
2. Repair methods shall be designated according to the repair material's physical properties (strength, minimum/maximum thickness etc.) and classified as following:

   - Hand troweled repair mortar (patch repair of localized deteriorations)
   - In-situ, durable, self-compacting, flow-able concrete (large volume repairs). Concrete mix designs shall be carried out by the Contractor in accordance with the nature of repairs and shall include admixtures as described and shown in respective drawings.

6.0 MATERIALS AND SUITABILITY TESTS

6.1 General Requirements

1. Materials to be used in the Works shall be factory-made, unless otherwise explicitly approved by the Engineer. The materials shall be suitably formulated to technically with the properties of the original concrete so as not to cause adverse effects on the repair works, and to fulfill the otherwise stipulated requirements of the Contract.

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2. While selecting and proposing the material to be used, consideration must be given to the special environmental conditions including high ambient temperature prevailing at Site. To this extent, curing agents shall be included in the suitability test program

3. The individual products and product systems require the approval of the Engineer based on suitability tests to be carried out. The Quality Assurance Program is to be adhered to in all respects. The Contractor shall not procure any materials for the Permanent Works unless the suitability tests have produced satisfactory results, and prior consent of the Engineer have been obtained.

6.2 Reinforcement Protective Coating

1. The reinforcing bars shall be sand blasted before application of the protective coatings to the satisfaction of the Engineer.

2. An anti-rust primer coating shall be applied to original cleaned bars, as directed by the Engineer. The material to be used for the anti-corrosion protective coating of the exposed reinforcing steel shall be a water-based primer formulated to penetrate rust, eliminate rust, penetrate to the bare metal and stop further rusting.

3. The anti rust primer shall be Corrverter Rust Primer by Cortec Corporation USA or Approved Equivalent. The application instructions of the manufacturer must be adhered to, well in consideration of the stipulations in these Specifications.

4. The Contractor shall exercise due care in ensuring that all exposed reinforcement, is fully coated especially where concrete has been removed from behind the reinforcement.

6.3 Bonding Agent

1. A bonding agent shall be applied to existing concrete surfaces against which the new concrete is to be cast.

2. The Bonding Agent shall be SikaTop Armatec 110 EpoCem by Sika or Approved Equivalent.

3. The application of bonding agent shall strictly be as per specifications and guidelines of the manufacturer.

6.4 Plasticizer

The structural repair concrete or structural concrete shall be made with Poly Carbooxylate Ether (PCE) based third generation superplastisizing admixture.

1. The minimum specifications for the plasticizer / admixture are as follows:

    - Shall be free of chloride & low alkali.
    - Shall be compatible with all types of cements.
    - Shall satisfy specifications of ASTM C-494 type G. or EN 934-2

2. The plasticizer shall be Sika Viscocrete 58-HT-PK or similar product from a reputable manufacturer as approved by Engineer.

3. The application of the plasticizer / admixture shall be strictly as per the specifications / recommendations of the manufacturer.

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6.5 Reinforcing Steel

Refer Section 2200

6.6 Trowellable Repair Mortar

1. Structural Repair Mortar shall be suitable for placing in thickness varying from 12 mm to 50 mm both vertically and overhead.

2. Structural Repair Mortar shall be capable to provide durable and strong structural repair suitable & compatible with existing concrete.

3. The mortar shall have shrinkage compensation i.e. the volume should be stable in wet and dry forms to reduce cracking.

4. Compressive Strength of repair mortar shall be at least 40 MPa at 28 days tested as per ASTM C109.

5. Structural Repair Mortar shall be Sika MonoTop 612-PK or Approved Equivalent.

6.7 Injectable Mortar

1. The injectable repair mortar shall be low viscosity epoxy resin based non-shrink crack injection system for sealing of cracks in damaged concrete.

2. The resin system / injection mortar shall be capable to repair cracks from 0.1 mm to 10 mm.

3. The resin system / injection mortar shall be capable to provide durable and strong structural repair suitable & compatible with existing concrete.

4. The resin system / injection mortar shall have shrinkage compensation i.e. the volume should be stable in wet and dry forms to reduce cracking.

5. Minimum compressive strength of the injection mortar shall be 60 MPa at 7 days.

7.0 SURFACE PREPARATION, FORMWORK AND REINFORCEMENT

7.1 Removal of Unsound Concrete

1. Proper preparation of the existent concrete is essential for satisfactory concrete repair. Irrespective of the type or position of the structure member to be repaired, or the type of repair to be made, all unsound and disintegrated concrete must be removed.

2. The Contractor shall demarcate clearly all defective areas of concrete. All demarcation lines shall be neat, square and straight. Repair areas shall be uniform and rectangular in shape. The extremities of the demarcated areas shall be beveled at an angle of approximately 45°. No feather edging of repair mortar will be accepted.

3. All visibly defected areas of concrete together with other carbonated concrete areas and chloride contaminated areas shall be dismantled to depths of sound, contaminant free and high alkaline base concrete and up to at least 25 mm behind all exposed rebars.

4. Chipping tools shall be selected such that they do not damage the surrounding areas. Heavy equipment would possibly damage the surrounding concrete and thus create additional areas of potential failure. The methods and tools to be employed are subject to consent of the Engineer.

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5. Special care must be taken in removing unsound concrete from around reinforcing steel bars or embedded anchorage or steel items to prevent loss of bond with the remaining sound concrete.

6. All cracks in the surface of the concrete must be identified and cut out / chased (as directed by the Engineer) to:

    - Expose corroded reinforcement and / or
    - Ensure that reinforcement is not corroding, and / or
    - Remove loose concrete debris and other deleterious material.

7. Old concrete repairs, both temporary and permanent, are to be removed by mechanical means back to a sound high alkaline base.

8. Full dimensions of all areas and average depths of concrete removed are to be recorded for acceptance by the Engineer, prior to repairs being carried out.

9. As directed by the Engineer, in positions where the ends of reinforcing bars are close to the front edge of a concrete profile and, are corroded or embedded in carbonated or chloride contaminated concrete, cut back the concrete to expose the bar and crop to provide a minimum cover of 50mm. Repair the concrete as specified. No reinforcement shall be cut or removed unless instructed by / agreed with the Engineer.

7.2 Preparation of Reinforcing Steel

1. All exposed reinforcement must be thoroughly cleaned by sand blasting to remove all corrosion, etc. and exposed clean, and subsequently by hand wire brushing, air cleaning or similar method to remove any loose material, dust etc.

2. Around corroded reinforcing steel bars and corroded embedded steel items the concrete shall be removed completely up to a depth of at least 25 mm behind the reinforcing bar or embedded steel item, to ensure proper encasement and bond. Where the unsound concrete exceeds beyond, it must be removed to such depth.

3. Loose and scaly rust must be removed completely from the steel parts by appropriate means. Loose concrete shall also be removed from the steel surface. Sandblasting will be the most effective cleaning method.

4. The fully cleaned and dry reinforcing steel bars and embedded steel items shall receive corrosion protection application in accordance with Subsection 6.2.

7.3 Preparation and Cleaning of Exposed Surfaces

1. The surfaces of all concrete repair areas shall be pressure water jetted to achieve an open textured surface free from loose and friable material or other contamination.

2. All prepared concrete repair areas shall be thoroughly saturated with clean, cold water for 24 h. Immediately thereafter excess water shall be removed from the surfaces by vacuum cleaner or dry air, to provide a slightly wet surface suitable to receive the repair material. The compressor of the cleaner must be equipped with a well-functioning oil separator to prevent contamination.

    The application of the repair material must be carried out immediately thereafter. This measure shall ensure that mixing water is not being absorbed by the old concrete, which would likely lead to deficiencies in the proper setting of the repair material and thus to defects in the repair work.

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Repair areas shall be adequately protected from direct sunshine, wind, rain and chloride contamination.

7.4 Formwork Requirements

1. Specially designed, easy-to-handle watertight formwork systems shall be provided by the Contractor, purpose-designed to meet the different requirements, i.e. shapes of structure members to be repaired.

2. The design and construction of the formwork and its supports shall comply with the applicable Standards. The system shall be sufficiently rigid to maintain the forms in the correct position so that the final shape of the concrete member corresponds to the requirements.

3. The supports shall be designed to suit the loading of dead-weight, formwork, working personnel, weight and forces of fresh concrete, effects of tide and waves, as well as incidental dynamic effects caused by placing the repair material.

4. The bottom form may be arranged sloped, to encourage the flow of repair material and to push-up any entrapped water or air pockets. In consideration of the very limited working windows within a tide low water cycle, the side forms shall be provided with quick locking devices to ease placing, fixing and securing in place.

5. The contractor shall submit to the Engineer the details of the formwork system, including checks on stability and bearing capacity.

6. The Engineer may reject any formwork system which does not meet the requirements, or which has become unsuitable due to reuse.

7. The inner surfaces shall be treated with a release agent, compatible with the concrete repair materials. Respective material description and a certificate from the agent / manufacturer is to be submitted to the Engineer for approval.

8. Before starting the placing of repair material, the Contractor must check the formwork for safety and accuracy of dimensions.

   The forms must be spotlessly clean, and the Contractor must undertake all steps to ensure complete removal of any undesirable matter. So far as seawater has penetrated the forms, all surfaces including the exposed concrete surfaces and reinforcing steel bars shall be cleaned of saline residues, mud and the like. Subsection 7.3 is to be adhered to in-this connection.

7.5 Providing of Additional Reinforcing Steel

1. After removal of the unsound concrete the Contractor shall measure, assess and record the degree of cross-section loss of the individual reinforcing steel bars. The so determined cross-sections shall be compared with the information contained in the as-built drawings from the original construction, which will be made available for this purpose to the Contractor by the Employer. With a resulting estimate on the cross-section loss, the Contractor shall adequately propose the required supplemental reinforcing bars. Corresponding shop drawings and bar bending schedules shall be submitted to the Engineer for approval.

2. Where corroded reinforcing steel bars are to be supplemented or replaced the material shall comply with Subsection 6.5.

3. Lap splices with accepted lap lengths are preferred. If welded laps shall be used in special cases, it must conform to the AWS codes for reinforcing steel welding or equivalent standard. The welders carrying out such work shall have a valid certificate

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from a public body or an independent material testing institute, regarding the type of welding to be carried out.

4. The reinforcement shall be accurately cut and bent to the shapes shown in the Drawings and in accordance with ACI-315. Reinforcing bars, which are not cut or bent true to size and which are unsuitable for any technical reason in the opinion of the Engineer shall not be installed and must be replaced to the satisfaction of the Engineer.

5. All reinforcements must be installed as per steel grades, number of bars, diameters, shapes, intervals and locations indicated In the Drawings. Spacers, chairs or other supports whether shown in the Drawings or not, shall be used to maintain the reinforcement in its correct position, to the satisfaction of the Engineer.

6. Laps and joints shall be made only as shown in the approved shop drawings. When it is necessary to lap reinforcement at points other than shown on the drawings, it shall be coordinated with the Engineer.

7. Any change in the designed arrangement of reinforcement which may become necessary during the works due to actual site conditions or otherwise, must be reported to and coordinated with the Engineer. The Contractor shall record those changes and incorporate them in the as-built drawings.

7.6 Anchorage of Supplemental Reinforcing Steel Bars

If the corrosion and consequential cross-section loss of reinforcing steel bars has reached the member's support, additional reinforcing steel bars must be inserted into the sound concrete of the support area.

The number and size of supplemental bars shall be determined as per Subsection 7.5. For anchoring the new bars adequately long anchor holes shall be drilled into the sound concrete. Diameter and length of drill holes shall be as per specifications of chemical anchor manufacturer, as shown in drawings.

An epoxy chemical anchor (Hilti HIT RE-500 or Fischer FIS-EM Plus or approved equivalent) shall be used for bonding the bar in the anchor hole.

Suitability tests (pull-out test) shall be carried out at site to confirm the safe anchorage of the bars in the original concrete with the selected materials and dimensions, prior to final use of the system in the Works. Test reports are to be submitted to the Engineer for approval.

7.7 Quality Control, Tests and Inspections

The individual stages of removal of unsound concrete, surface preparation, improvement of reinforcing steel bars and formwork require strict supervision and control by the Contractor to the satisfaction of the Engineer in accordance with the Quality Assurance Program to be established.

8.0 USE OF CASTABLE MORTAR / CONCRETE

8.1 Material and Equipment

1. Materials shall conform to Subsection 6.0.

2. The equipment for proportioning and mixing as well as pumps and transfer pipes and hoses shall be clean to ensure the quality of the cast-able material. Its proper functioning must be checked by the Contractor regularly to ensure that design mix requirements are

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well maintained and to minimize the risk of slowdowns, breakdowns and plug-ups (hose blockage) during the casting process.

The number of mixing and transfer equipment sets shall be determined by the Contractor in consideration of the work progress to be achieved, plus stand-by equipment as a spare capacity in case of breakdown.

3. The equipment set up as well as the material stored adjacent to it shall be well protected against direct exposure to sun and rain.

8.2 Standard of Work Execution

8.2.1 Standard of Work Execution

Casting of flow-able mortar/concrete shall be executed by grout / concrete pump, unless site trials to be executed by the Contractor to proof different. The standard of work execution shall follow the standard applicable to well in consideration of this section and the otherwise applicable conditions of the Contract.

8.2.2 Surface Preparation

Surface preparation shall follow subsections 7.1 and 7.3. The exposed surfaces are expected to be very porous and shall be pre-wetted for some time prior to filling the repair material, to minimize absorption of mixing water from the grout mix. For wetting the surfaces only potable water shall be used.

8.2.3 Formwork

Formwork shall conform with Subsection 7.4.

8.2.4 Reinforcement

Reinforcement shall conform with Subsections 6.5, 7.2, 7.5, and 7.6.

8.2.5 Construction Joints

The casting of a structural member shall be completed within one tidal window, subject to the condition that the rising tide shall not reach the freshly cast mortar/concrete earlier than two hours after pouring the concrete repair material.

Should, despite of all precautions, a section of work be left incomplete at the end of a tide working window, appropriate provision shall be made to assure that the joint will not develop a plane of weakness at this point. The design of such construction joints shall be proposed by the Contractor prior to first commencement of concrete repair works, subject to Engineer's approval.

8.2.6 Hot Weather Concreting

For the cast-able concrete, it is desirable that the time from mixing to pouring a mix does not exceed the order of 45 minutes. The temperature of the concrete should be maintained below 32°C during all phases of the application procedure.

8.2.7 Curing and Stripping

The cast concrete shall be properly cured so that the potential strength, water tightness and durability are fully developed. This is particularly important for thin sections, as well as at seasonally high ambient temperatures, as prevalent at Site. Basically, all repaired concrete surfaces are to be kept continuously wet for seven (7) days.
After finishing the casting, the forms shall be covered immediately and protected against direct sunlight, high temperature, low humidity and drying winds by appropriate measures.

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The side forms should be loosened as soon as this is possible without damaging the concrete and provisions shall be made for the curing water to run down inside the forms. The side forms may be removed completely after two days of casting the member and the so fully exposed surfaces shall promptly receive a uniformly wet cover, which shall be kept wet continuously until the end of the curing period.

The use of liquid membrane forming curing compounds may be acceptable, provided that:

- Curing compound is suitable under the prevailing environmental and climatic conditions, including high ambient temperatures and limits the moisture loss to less than 0.4 kg/m^2 within 72 hours when tested as per ASTM C 156.
- Manufacturer confirms, and the contractor can demonstrate within the suitability tests that the curing compound will not in any way be detrimental to the application, bonding and performance of subsequent protective coatings. Or;
- Contractor undertakes to remove the curing membrane entirely prior to application of subsequent concrete protective coats, by approved methods.

Curing compound may be applied by spray nozzle or by hand. Manual application should be in two passes, with the second one proceeding at right angles to the first application.

8.3 Verification of Concrete Quality

1. Suitability test shall be carried out and shall comply with Subsection 6.0.
2. Routine quality control during casting of flow-able mortar / concrete shall include testing of fresh mix as well as of hardened concrete for every day of concreting.

9.0 PATCHING OF DAMAGES, BONDING OF CRACKS

9.1 Definition

1. Patching of damages refers to spot repairs of a limited area and depth, and for which a repair by casting with flow-able mortar / concrete would be unfeasible. Such spot repairs are generally to be decided on a case to case basis between the Contractor and the Engineer.
2. Sealing and bonding of cracks refers to structural cracks in an otherwise sound and non-contaminated concrete member of the structure. Dependent on the crack width, depth and its position in the structure, either gravity feed method or pressure injection may be employed. Sealing and bonding of cracks will generally to be decided on a case to case basis between the Contractor and the Engineer.

9.2 Patching of Concrete Damages

9.2.1 Surface Preparation

Surface preparation, including those of the exposed reinforcing steel shall conform with Subsection 7.0.

9.2.2 Surface Tests Prior to Filling of Repair Material

The exposed surfaces shall be inspected visually and shall be sound and free of loose particles or substances detrimental to the proper bonding and performance of the repair.

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9.2.3 Application of Repair System

The repair material shall conform with the requirements of subsection 6.0.

A bonding agent appropriate to the approved repair mortar and meeting the requirements of Subsection 6.3 is to be applied on the prepared surfaces, followed by the application of the repair mortar.

The layer thickness shall be 10 mm minimum, with an upper limit of 50 mm, unless the material manufacturer recommends otherwise, and the Contractor can submit evidence based on trials and in-situ tests.

9.2.4 Curing

After complete finishing the patch repair shall be covered immediately and protected against direct sunlight, high temperature, low humidity and drying winds by appropriate measures. About after one hour of finishing light potable water fogging shall start and be maintained for at least 48 hours. Alternatively, a suitable curing agent may be applied.

9.2.5 Safety Precautions

The manufacturer's recommendations for health and safety precautions are to be strictly observed.

9.3 Pressure Injection of Cracks

9.3.1 Preparation for Crack Injection

The surfaces around the crack shall be sound and clean. Any loose materials shall be removed by appropriate means. The crack surface shall be sealed all along with a suitable epoxy mortar. Injection ports (packers) shall be installed along the crack, whereby the spacing between the individual ports must be decided in consideration of the crack width and depth to be sealed, Normally, the spacing should vary between 30 cm and 50 cm.

After complete hardening of the surface seal, each injection port is to be blown-through in a continuous sequence with compressed air, starting from the bottom of the crack in case of a vertical application. The air compressor must be equipped with a well-functioning oil separator to prevent contamination.

9.3.2 Materials

The crack sealing compound shall correspond to Subsection 6.7

9.3.3 Application

The ready mixed sealant shall be injected using common pressure hand guns, immediately after mixing. Care must be taken to observe the specified pot life of the mixed material.

For a vertical crack position, the injection shall commence from the lowest port, applying a slow and even pressure until the material starts to exit from the port immediately above. The injection gun shall then be removed, and the respective port sealed with a plug, the injection process is then to be continued similarly at each port until the top end of the crack is reached.

The consumption of injection material shall be properly recorded, not only for measurement and payment, but also to detect hollows in the structure or check that the material does not exit at another location of the structure.

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For horizontal cracks to be pressure injected the procedure is to be followed analogously.

9.3.4 Safety Precautions

The manufacturer's recommendations for health and safety precautions are to be strictly observed.

10.0 Structural Concrete Repair

10.1.1 Measurement

Measurement of acceptably completed works of respective type of structural concrete repair works will be made on the basis of actual unit as given in the Bill of quantities and as shown on the drawings and or as directed by the Engineer.

10.1.1 Payment

Payment will be made for acceptable measured quantity of acceptably completed works of structural concrete repair on the basis of unit rate per running meter as quoted in the Bills of Quantities & shall constitute full compensation for all the works related to the item.

*** End of Section 2330 ***

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SECTION – 3100

MISCELLANEOUS STEEL WORKS

1.0 SCOPE

The work under this section of Specifications consists of supply of all material, labour, plant, equipment and appliances required for Miscellaneous Steel works such as embedded items, steel pipe railing and any other work shown in the drawings and as directed by the Engineer.

2.0 APPLICABLE STANDARDS

Latest edition of the following standards are relevant to these Specifications, wherever applicable:

AISC	Code of Standard practice.
ASTM	A-36 for structural steel.
ASTM	A-53 steel pipe for railing.
AISC/SSPC	Guide to Shop painting for structural steel.
AWS D1.1	Structural Welding Code - Steel Specifications for welding of steel structures.

3.0 DRAWINGS.

3.1 Design Drawings.

Design working drawings shall be supplied to the Contractor. These shall contain main dimensions, sizes of members, typical details, etc.

3.2 Shop Drawings.

Shop drawings shall be prepared by the Contractor from the working drawing supplied, taking into consideration the instructions given by the Engineer and submitted to the Engineer for his approval. No work shall commence until shop drawing is approved by the Engineer.

4.0 MATERIAL

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

4.1 Structural Steel

Structural Steel shall conform to the requirements of ASTM A-36 or equivalent.

Pipe for hand rail shall conform to the requirements of ASTM A-53.

4.2 Welding

Welding Electrodes shall conform to the specifications for mild steel covered Arc-welding Electrodes, AWS A5.1 latest edition. Equivalent locally manufactured electrodes may be used subject to the approval of the Engineer.

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5.0 FABRICATION

The Contractor shall notify the Engineer about any problems or doubts/errors discovered in the drawings supplied by the Engineer for clarification/rectification well in time to prevent any fabrication errors. Fabrication shall not be commenced until approval has been obtained from the Engineer.

5.1 Straightening of Material

Rolled material, before being worked upon must be straightened. Straightening necessarily shall be done by mechanical means or by the application of a limited amount of localized heat.

5.2 Cutting

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

5.3 Holes Punching/Drilling

Holes shall be punched where thickness of the material is not greater than the diameter of bolt by + 1/8 inch. Where the thickness of the material is greater, the holes shall either be drilled or sub-punched and reamed to size. The dia for all sub-punched holes and the dia. of all drilled holes shall be at least 1/12 inch smaller than the nominal diameter of the rivet or bolt.

5.4 Welding

5.4.1 General: The execution and inspection of welding will be done in accordance with the provisions of the American Welding Society Code for Welding in Building construction, D1.1.

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

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

5.5 Tolerances

The maximum variation in the distance from centre to centre of holes for rivets or bolts shall not be greater than 1mm.

5.6 Methodology

Fabrication shall be carried out using all the necessary tools, plant and equipment in accordance with methodology for fabrication approved by the Engineer.

6.0 INSPECTION AND TESTS

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

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

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7.0 ERECTION/INSTALLATION

Erection/Installation work shall be carried out by using required tools, plant and equipment in accordance with methodology for erection approved by the Engineer.

8.0 SURFACE PREPARATION/PAINTING

8.1 Surface Preparation

- These Specifications withdrawn shall govern the procedures and materials required for surface preparation and coating of the specified structures.

- All fabrication and assembly of a particular section shall be completed before surface preparation begins.

- All blast cleaning on metal surface should be carried out by Copper Slag abrasive and grit should not be recycled to avoid contamination of surface in accordance with the SSPC specification required for that particular area. Blasting anchor profiles shall be consistent with manufacturer's recommendations.

- All blasting should be scheduled in a manner which enables paint to be applied in accordance with the manufacturer's recommendations and on the same day as blasting occurs.

- All welded area and appurtenances shall be given special attention for removal of welding flux in crevices. Welding splatters, slivers, laminations and under laying mill scale exposed during blasting shall removed or repaired. Bolt holes shall be drilled and de-burred prior to blasting. Sharp edges shall be ground or filed to provide a visible radius.

- The abrasives used for blasting will be sized to give the specified anchor profile as determined by this specification. A mesh size will be used as prescribed for thickness of paint to be applied. The maximum particle size shall be no larger than that passing a 16 mesh screen.

- No acid washes or other cleaning solutions or solvents may be used on metal surfaces after being blasted. This includes any inhibitive washes intended to prevent rusting.

- All oil and/or grease contamination shall be removed by water based degreaser before starting to blast like glo-flo heavy duty degreaser or equivalent.

- No intermediate or finish coating shall be applied prior to fabrication without prior approval from Engineer.

- Blasting shall be done is an area removed from painting operations and freshly coated surfaces to prevent contamination. Contaminated coatings shall be re-blasted by Contractor to bare metal and reapplied.

- After blasting Contractor shall thoroughly clean all blast grit and dust from both internal and external surfaces, including removal from crevices, recesses etc.

8.2 Coating Application

- Coating application will be done according to paint manufacturer's recommendations included with the materials and will be subject to inspection by Engineer.

- The blast-cleaned surfaces shall be coated with primer during the same day as blasted and at least one hour prior to sundown of the day, and also before any rusting occurs. A minimum of 150mm (6 inches) around edges of sand blasted area

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will be left un-primed unless adjoining a coated surface. Any steel/metal that is not primed and is wet by rain or moisture shall be re-blasted prior to application of primer.

- All coating shall be allowed to dry thoroughly, but not less than the manufacturer's specified time, prior to application of a succeeding coat.

- The surface shall be clean, dry and free from dust before application of any coat of paint.

- All coating materials furnish by Contractor shall be furnished in unopened, clearly identifiable containers. Mixing of different coatings shall not be permitted. Containers shall remain closed until required for use. No paint shall be used that has expired its shelf life.

- All coating film thickness shall be as specified and shall be checked by the Engineer or his Representative.

- Damage to intermediate coats, prior to application of the next coat, shall be repaired by Contractor to provide the coating sequence and film thickness as specified.

- After the prime coat has been applied, all hard-to-spray areas such as corners. edges and welds, may be brush painted with the same paint and film thickness.

- The finished job shall not contain sags, runs, wrinkles, spots. blister or other application flaws.

- Holidays in the final coat at edges, corners, welds and inaccessible areas may be protected by spraying or hand brushing an additional layer of topcoat provided excessive build up does not occur.

- All components shall be thoroughly stirred before, during and after mixing. The mixed coatings shall be continuously stirred by mechanical spray pot agitators or other approved means. The volume to be mixed shall be accurately measured. All mixing shall be done in clean containers, free from traces of grease, other type paints, or other contaminates. All containers shall be kept covered to prevent contamination by dust, dirt or rain.

8.3 Repair of Damaged Area (Touch-UP)

- All external surfaces where coating is damaged during fabrication, transportation and erection shall be repaired as follows:

- Top coat damaged, but base coat undamaged, will be repaired by removing damaged coating with sand paper or other means acceptable to the Engineer (wire brushing will not be acceptable) and applying top coat as specified.

- Coating damaged to base metal where blasting is not approved shall be mechanically cleaned as specified in other Section and applying a three coats system as specified in relevant sections.

- Care will be taken to avoid damaging the coatings surrounding repaired areas and to assure complete tie-in of the coating with surrounding areas.

- Remove damaged areas by spot blast and feather into surrounding coating with sandpaper. Clean all loose materials from surface.

- Contractor shall repair the coating on all damaged areas prior to final acceptance of the Engineer.

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9.0 PAINT AND COATING SYSTEMS FOR STEEL METAL WORKS

The paints and coating systems have been specified hereunder for steel/ metal works like pipe support, angle iron support in trenches, manufactured by Jotun paint or approved equivalent as approved by the Engineer and all such surfaces as shown on the Drawings and/or as directed by the Engineer. All paint applications to be carried out by airless spray.

9.1 Exterior Paint System for Steel Structures

9.1.1 Surface Preparation

Abrasive blasting to Near White with copper slag in accordance with SSPC-SP10 and SSPC-AB1 to provide 40 to 60 microns anchor profile.

9.1.2 Paint System

Primer:	Surface tolerant epoxy mastic to be applied at 70 microns DFT.
Intermediate Coats:	Surface tolerant epoxy mastic paint to be applied in two layers, each layer of thickness 100 microns DFT of approved color. (JOTAMASTIC 87 or approved equivalent).
Final Coat: (Top Coat)	Two components polyurethane enamel of 60 microns DFT of approved color (HARDTOP XP AS or approved equivalent) to applied as top coat.

10.0 GALVANIZING

Steel platform, pipe works supports, ladder, etc. specified as well as screws and nuts associated shall be hot-dip galvanized, electrolytically galvanized or sheradized, as appropriate to the particular element.

Galvanizing shall be performed in accordance with VDE Standard 0210.

Material: For galvanizing, only original blast-furnace raw zinc shall be applied, which shall have a purity of 98.5%.

The thickness of the zinc coat shall be:

- for screws, washers, nuts and similar hardware a minimum of 60 micron
- for all other parts, except for parts intermittently or permanently submerged in water, a minimum of 70 micron
- for parts intermittently or permanently submerged in water, a minimum of 140 micron, in accordance with "VDEW, Druckrohrleitungen - Association of German Electricity Utility Companies, Steel Pen-stocks".

Cleaning: All material to be galvanized shall be cleaned carefully of rust, loose scale, dirt, oil, grease, and other foreign substances. Particular care shall be taken to clean slag from welded areas.

Galvanizing of plates and shapes: Where pieces are of such lengths that they cannot be dipped in one operation, great care shall be exercised to prevent warping.

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Material on which galvanizing has been damaged shall be re-dipped unless the damage is local and can be repaired by soldering or by applying a galvanizing repair compound; in this case, the compound shall be applied in accordance with the manufacturers' instructions.

Soldering shall be done with a soldering iron using 50/50 solder (tin and lead). Surplus flux or acid shall be washed off promptly and the work shall be performed so as not to damage the adjacent coating or the metal itself. Any member on which the galvanized coating becomes damaged after having been dipped twice shall be rejected.

11.0 MEASUREMENT & 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 work related to the relevant items of the Bill of Quantities. The cost there of shall be deemed to have been included in the quoted unit rates of the respective items of the Bill of Quantities.

11.1.1 Nuts, bolts, screws, rivets, heads, fillets, welds and welding rods.

11.1.2 Surface preparation and painting works.

11.1.3 All embedded parts

11.1.4 Galvanizing, if required

10.1.5 Glazing

10.1.6 MS Sheets

10.1.7 Hardware, fixing accessories etc. for metal doors

10.1.8 Platform detail of steel member.

11.2 Galvanized Steel Ladder

11.2.1 Measurement

Measurement of acceptably completed Works of supply, fabrication and installation of galvanized steel ladder, including anchor bolts, embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as per original (existing) design drawings available with the Employer will be made on the basis of weight in kilogram, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the Contract and approved shop drawing.

11.2.2 Payment

Payment will be made for acceptable measured quantity of galvanized steel ladder on the basis of unit rate per kilogram quoted in the Bill of Quantities and shall constitute full compensation for all the Works related to the item.

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11.3 Epoxy Painted MS Hand Rails

11.3.1 Measurement

Measurement of acceptably completed Works of Supply, fabrication and installation of epoxy painted MS hand rails including embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as shown on the drawings and as per Bill of Quantities, will be made on the basis of weight in kilogram, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the Contract and approved shop drawing.

11.3.2 Payment

This item is for rate only in Kilogram. Payment will be made for acceptable measured quantity of epoxy painted MS hand Rails, mounted railing on the basis of unit rate per kilogram quoted in the Bill of Quantities and shall constitute full compensation for all the Works related to the item.

11.4 Anchor Bolts

11.4.1 Measurement

Measurement of acceptably completed Works of Providing and installation of anchor bolts of the different diameters, complete in all respects as shown on the drawings and as mentioned in Bill of Quantities will be made on the basis of number, according to approved shop drawings, after verification at site to the satisfaction of the Engineer that the items fabricated, supplied and erected in position conform with the Contract and approved shop drawing.

11.4.2 Payment

This item is for rate only in Number. Payment will be made for acceptable measured quantity of anchor bolts on the basis of unit rate per number quoted in the Bill of Quantities and shall constitute full compensation for all the Works related to the item.

*** End of Section 3100 ***

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KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWINGS

JULY, 2026

National Engineering Services Pakistan (Pvt.) Limited
13th Floor, N.I.C.L. Building, Abbasi Shaheed Road, Off Shahra-e-Faisal, Karachi-74400 Pakistan

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GENERAL NOTES

A. GENERAL

1. NOTES GIVEN ON THIS DRAWING ARE APPLICABLE TO ALL STRUCTURAL DRAWINGS UNLESS OTHERWISE NOTED. NOTES WRITTEN ON ANY OTHER DRAWING SHALL BE APPLICABLE TO THAT PARTICULAR DRAWING ONLY UNLESS OTHERWISE CROSS REFERRED.
2. SYSTEM OF UNITS IS S.I. ALL DIMENSIONS ARE GIVEN IN MILLIMETERS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE SAFETY AND STABILITY OF THE EXISTING STRUCTURE AND ALL TEMPORARY WORKS DURING CONSTRUCTION.
4. THE CONTRACTOR SHALL INFORM THE ENGINEER ABOUT ANTICIPATED CONSTRUCTION LOADS IN THE STRUCTURE AND OBTAIN ENGINEER'S APPROVAL THEREOF BEFORE COMMENCING THE WORK.
5. THE CONTRACTOR SHALL CO-ORDINATE ALL DESIGN AND AS-BUILT DRAWINGS OF ALL DISCIPLINES FOR ALL ITEMS INCLUDING BUT NOT LIMITED TO SIZES AND LOCATION OF ALL OPENINGS REQUIRED FOR DUCTS, PIPES AND PIPE SLEEVES, ELECTRICAL CONDUITS AND OTHER ITEMS TO BE EMBEDDED IN CONCRETE OR OTHERWISE INCORPORATED IN STRUCTURAL WORK AND SHALL BRING TO THE NOTICE OF THE ENGINEER DISCREPANCIES, IF ANY, FOR HIS INSTRUCTIONS, PRIOR TO THE START OF WORK.
6. THE CONTRACTOR SHALL VERIFY LAYOUT, CONFIGURATION, ALL DIMENSIONS AND LEVELS PERTAINING TO EXISTING WORKS BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL ADOPT ADEQUATE AND APPROPRIATE MEASURES SO AS NOT TO DAMAGE THE EXISTING WORKS.
7. THE CONTRACTOR SHALL EXERCISE UTMOST CARE AND PRECAUTION DURING THE WORKS, AGAINST ANY MISHAPS OR ACCIDENTS, FOR WHICH THE CONTRACTOR SHALL BE WHOLLY AND SOLELY RESPONSIBLE. THE CONTRACTOR SHALL INDEMNIFY THE CLIENT AGAINST ANY ACCIDENTS AND ANY LOSSES THEREFROM AND SHALL REPAIR AND RECTIFY THEM AT HIS OWN COST AND TIME.
8. THE CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION WITH SUPPLY AND INSTALLATION OF EQUIPMENT.
9. PROVISIONS SHALL BE MADE FOR INSTALLATION OF EQUIPMENT AS PER MANUFACTURER'S RECOMMENDATIONS.
10. ANY DEPARTURES/DEVIATIONS DESIRED FROM THE DESIGN OR SPECIFICATIONS, OR SOLUTIONS TO ANY PROBLEMS ENCOUNTERED, SHALL BE GOT APPROVED FROM THE ENGINEER PRIOR TO IMPLEMENTATION. UNAPPROVED DEPARTURES/DEVIATIONS MAY LEAD TO REJECTION/ REPLACEMENT OF THE ENTIRE WORK AT THE CONTRACTOR'S COST.
11. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO SPECIFICATIONS OF THE CONTRACT. IN ABSENCE OF ANY EXPRESS OR IMPLIED SPECIFICATION IN THE CONTRACT, ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO RELEVANT AMERICAN STANDARDS AND SHALL BE SUBJECT TO APPROVAL OF THE ENGINEER.
12. THE CONTRACTOR SHALL PREPARE AND SUBMIT DETAILED METHODOLOGY OF WORK, SEQUENCE OF CONSTRUCTION / REPAIR WORK, SHOP DRAWINGS AND BAR BENDING SCHEDULES FOR ENGINEER'S APPROVAL AND OBTAIN THEIR APPROVAL BEFORE PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE METHODOLOGY & SEQUENCE OF WORK AND THE ACCURACY OF SHOP DRAWINGS & BAR BENDING SCHEDULES. THE ENGINEER'S APPROVAL SHALL NOT RELIEVE THE CONTRACTOR FROM HIS RESPONSIBILITY.
13. THE CONTRACTOR SHALL ALSO STUDY ALL EXISTING DRAWINGS OF UNLOADING JETTY AND APPROACH BRIDGES AVAILABLE WITH THE CLIENT FOR PREPARATION OF REPAIR SHOP DRAWINGS.
14. THE CONTRACTOR SHALL STUDY TESTING REPORT OF VELOSI INTEGRITY & SAFETY PAKISTAN PVT LTD. AVAILABLE WITH THE EMPLOYER FOR OVER VIEW OF THE DETERIORATED AREAS.
15. CONTRACTOR SHALL VERIFY THE DETERIORATED CONCRETE SURFACES SHOWN IN THE VELOSI'S REPORT AND ALSO CARRY OUT DELAMINATION SURVEY AS PER SPECIFICATION FOR AREAS SHOWN AS INACCESSIBLE IN THE REPORT.

B. EXCAVATION AND BACKFILLING

1. ALL EXCAVATIONS IF REQUIRED, SHALL BE MADE BY HAND EXCEPT PRIOR APPROVAL OF THE ENGINEER.
2. THE CONTRACTOR SHALL SUPPLY AND ERECT ADEQUATE SHORING TO SUPPORT THE SIDES OF ALL EXCAVATIONS WHERE REQUIRED TO SAFEGUARD WORKMEN AND PROTECT ANY ADJACENT STRUCTURES.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEWATERING SYSTEM IF AND WHERE REQUIRED DURING CONSTRUCTION.
4. EXISTING UNDERGROUND SERVICES, REQUIRED TO BE LEFT IN POSITION, SHALL BE CAREFULLY PROTECTED DURING EXCAVATION AND BACKFILLING OPERATIONS.

C. REINFORCED CONCRETE FOR REPAIR WORK

1. ALL CONCRETE SHALL BE TESTED IN ACCORDANCE WITH ASTM STANDARDS C31, C39, C172 & SPECIFICATIONS AND THE MINIMUM CYLINDER STRENGTH OF CONCRETE AT 28 DAYS SHALL BE AS FOLLOWS. TESTING OF CLASS D & E CONCRETE SHALL BE PERFORMED IF SO DIRECTED BY THE ENGINEER.

CLASS	MIN. CYLINDER CRUSHING STRENGTH AT 28 DAYS (MPa)
A2	40
A1	35
A	28
B	21
C	17
D	8

2. MODIFIED CEMENT WITH FOLLOWING LIMITATIONS SHALL BE USED.
   - C_3A SHALL NEITHER BE LESS THAN 5% NOR MORE THAN 8%.
   - C_4AF+2C_3A SHALL BE LESS THAN OR EQUAL TO 25%.
   - Al_2O_3 SHALL BE LESS THAN OR EQUAL TO 6%.
3. ALL STRUCTURAL REPAIR CONCRETE SHALL BE CLASS-A2 SELF CONSOLIDATING CONCRETE (SCC) WITH REDUCED AGGREGATE 10mm DOWN USING POLYCARBOXYLATE ETHER BASED SUPER PLASTICIZER (SIKA VISCOCRETE-3SHT-PK OR XTREME WANDER BY X-CALIBUR OR APPROVED EQUIVALENT).
4. ALL STRUCTURAL CONCRETE FOR PRECAST AND CAST IN SITU ELEMENTS SHALL BE CLASS-A2 CONCRETE WITH AGGREGATE 20mm DOWN USING POLYCARBOXYLATE ETHER BASED SUPER PLASTICIZER (SIKA VISCOCRETE-3SHT-PK OR XTREME WANDER BY X-CALIBUR OR APPROVED EQUIVALENT).
5. A MIGRATING CORROSION INHIBITING ADMIXTURE (MCI 2005 BY CORTEC CORPORATION OR FLAMOGARD HOT 81 SMA OF X-ART CN BY X-CALIBUR (OR APPROVED EQUIVALENT) SHALL BE ADDED IN ALL STRUCTURAL CONCRETE AND REPAIR STRUCTURAL CONCRETE AS PER MANUFACTURE'S SPECIFICATIONS.
6. SILICA FUME AND FLY ASH SHALL BE ADDED IN ALL STRUCTURAL CONCRETE AND STRUCTURAL REPAIR CONCRETE AS SUPPLEMENTARY CEMENTITIOUS MATERIALS IN THE APPROVED PROPORTIONS FOR DURABILITY AND IMPERMEABILITY OF CONCRETE.
7. MIX DESIGN SHALL BE CARRIED OUT BY THE CONTRACTOR INCLUDING ALL OF THE ABOVE ADDITIVES AND TEST RESULTS OF THE CYLINDERS IN TERMS OF STRENGTH AND PERMEABILITY ALONG WITH SLUMP RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.
8. WATER/CEMENT RATIO FOR STRUCTURAL CONCRETE SHALL NOT EXCEED 0.40.
9. CONCRETE CLEAR COVER FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

STRUCTURAL CONCRETE	MINIMUM COVER (mm)
a) CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH	75
b) EXPOSED TO EARTH OR WEATHER	
- BAR DIA GREATER THAN OR EQUAL TO 20MM	50
- BAR DIA LESS THAN OR EQUAL TO 16MM	50
c) NEITHER EXPOSED TO WEATHER NOR IN CONTACT WITH GROUND	
SLABS, WALLS	20
BEAMS, COLUMNS	
PRIMARY REINFORCEMENT, TIES, STIRRUPS	40

10. CURING COMPOUND SHALL NOT BE USED ON CONCRETE SURFACES WHERE A HYDROPHOBIC AGENT IS TO BE APPLIED.
11. A SILANE BASED WATER REPELLENT (SIKAGARD 705-L OR X-SHIELD FLUROSIL 100 BY X-CALIBUR OR APPROVED EQUIVALENT) SHALL BE APPLIED ON SURFACES OF BEAMS, PILE HEADS AND BOTTOM OF PLANKS/DECK AFTER CURING OF NEWLY PLACED CONCRETE AS PER MANUFACTURER'S RECOMMENDATION.
12. ALL REINFORCEMENT SHALL BE DEFORMED, HOT ROLLED BILLET STEEL BARS CONFORMING TO ASTM A-705 GRADE 60.
13. ALL DETAILING SHALL BE DONE AS PER DETAILING DONE IN THE EXISTING STRUCTURE AND IS GIVEN IN THE DRAWING. HOWEVER, IN ABSENCE OF THE DETAILS ALL THE DETAILING SHALL BE DONE AS PER ACI STANDARDS ACI-315 & ACI-318 WITH APPROVAL OF THE ENGINEER.
14. ALL REINFORCING STEEL SHALL BE HELD FIRMLY IN PLACE BEFORE AND DURING THE PLACING OF CONCRETE BY MEANS OF WIRES AND SUPPORTS ADEQUATE TO PREVENT DISPLACEMENT DURING THE COURSE OF CONSTRUCTION.
15. ALL EXPOSED CONCRETE SHALL BE FAIR FACED.

D. CONCRETE CONSTRUCTION

1. THE CONTRACTOR SHALL SUBMIT THE METHODOLOGY AND SCHEDULE FOR APPLICATION OF CONCRETE FOR THE ENGINEER'S APPROVAL. NO CONCRETE SHALL BE APPLIED UNTIL ITS FORM WORK AND REPLACED REINFORCEMENT HAS BEEN INSPECTED AND APPROVED BY THE ENGINEER.
2. DURING CONSTRUCTION, STACKING OF CONSTRUCTION MATERIALS, PAVERS, etc... SHOULD BE AVOIDED ON DECK SLAB.
3. BEFORE POURING OF NEW CONCRETE TO ANY STRUCTURAL FORM THE CONTRACTOR SHALL ENSURE THAT ALL THE NEW STEEL IS PROPERLY PLACED AND FIXED AND ALL THE EMBEDDED ITEMS ARE FIXED.
4. ALL CONCRETING SHALL BE SCHEDULED & CARRIED OUT IN SUCH A MANNER THAT IT COULD NOT ENCOUNTER BY THE SEA WATER BEFORE IT GETS HARDENED. THE SCHEDULE OF CONCRETING SHALL BE SUBMITTED TO THE ENGINEER AND THE WORK SHALL BE EXECUTED AFTER APPROVAL OF THE ENGINEER.

E. PROPPING, SHORING & CURING

1. SHORE & BRACE ALL PARTS OF THE STRUCTURE DURING REPAIR WORK, TO THE EXTENT NECESSARY TO ENSURE COMPLETE SAFETY, STRENGTH & SERVICEABILITY OF ALL STRUCTURAL ELEMENTS UNDER ALL CONDITIONS OF LOADS WHICH MAY OCCUR DURING CONSTRUCTION. SUCH SHORING & BRACING IS THE CONTRACTOR'S SOLE RESPONSIBILITY AND IS NOT SHOWN ON STRUCTURAL DRAWINGS OR SPECIFIED IN THE PROJECT.
2. THE CONTRACTOR SHALL SUBMIT THE COMPLETE AND DETAILED SCHEME OF SHORING, PROPPING, CURING AND SEQUENCE OF REMOVAL OF FORM WORK DURING THE REPAIR WORK FOR THE ENGINEER'S REVIEW AND APPROVAL.
3. PROPPING SHALL NOT BE REMOVED TILL THE NEW CONCRETE IS MATURED, PROPERLY CURED AND GAINS ITS FULL STRENGTH.
4. PROPPING SHALL NOT BE REMOVED AT ONCE BUT SLOWLY AND GRADUALLY.

F. STRUCTURAL STEEL

1. ALL FABRICATION, PAINTING, ERECTION AND QUALITY CONTROL SHALL BE PERFORMED IN ACCORDANCE WITH LATEST AISC SPECIFICATIONS.
2. ALL STRUCTURAL STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A-36 AND A-6.
3. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE REQUIREMENTS OF AMERICAN WELDING SOCIETY SPECIFICATIONS USING ELECTRODES E7018 FOR MEMBER THICKNESS OF 8mm OR ABOVE. OTHER WISE E6013 SHALL BE USED FOR MEMBER THICKNESS LESS THAN 8mm.
4. ALL BOLTS SHALL BE TIGHTENED TO SPECIFIED TORQUE AS PER RELEVANT ASTM STANDARD, USING CALIBRATED WRENCH UNLESS OTHERWISE NOTED. HIGH STRENGTH BOLTS AND NUTS CONFORMING TO ASTM A325 STANDARD, LOOSENED AFTER TIGHTENING, MUST NOT BE RE-USED AND SHALL BE DISCARDED IMMEDIATELY.
5. UNLESS NOTED OTHERWISE, MINIMUM LEG SIZE OF FILLET WELDS SHALL BE 6 mm, LENGTH OF WELD SHALL NOT BE LESS THAN 25 mm.
6. ALL TESTS SHALL BE CARRIED OUT IN PRESENCE OF THE ENGINEER'S REPRESENTATIVE. ALL TEST REPORTS, IN ORIGINAL, SHALL BE SUBMITTED TO THE ENGINEER.
7. SHOP CONNECTIONS MAY BE WELDED OR BOLTED.
8. FIELD CONNECTIONS SHALL NOT BE WELDED UNLESS SHOWN ON THE DRAWINGS OR UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER.
9. FIELD WELDING ON MEMBERS CARRYING LOADS IS NOT PERMITTED IN ANY CASE, EXCEPT WITH PRIOR WRITTEN APPROVAL OF THE ENGINEER.
10. WHERE FIELD WELDING IS SPECIFIED CONTRACTOR SHALL USE NECESSARY SEATS AND/OR ERECTION BOLTS TO FACILITATE THE WELDING.
11. NO HOLES, EXCEPT THOSE SPECIFIED OR APPROVED BY THE ENGINEER, SHALL BE MADE IN ANY MEMBER.
12. SURFACE PREPARATION OF ALL STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH THE LATEST ISSUE OF "STEEL STRUCTURES PAINTING COUNCIL" SPECIFICATIONS SP-6 FOR COMMERCIAL BLAST CLEANING.
13. ALL STEEL ELEMENTS / MEMBERS / PLATES SHALL BE HOT DIP GALVANIZED. PORTIONS WHERE WELDING IS DONE SHALL BE PAINTED WITH ZINC COATING.
14. STRUCTURAL STEEL FOR WHICH HOT DIP GALVANIZATION IS NOT APPLICABLE SHALL BE PAINTED AS FOLLOWS:
    a. SURFACE PREPARATION: ABRASIVE BLASTING TO NEAR WHITE WITH COPPER SLAG IN ACCORDANCE WITH SSPC-SP10 AND SSPC-AB1 TO PROVIDE 40 TO 60 MICRONS ANCHOR PROFILE.
    b. PRIMER: SURFACE TOLERANT EPOXY OF 75 MICRON DFT.
    c. 1ST COAT: SURFACE TOLERANT EPOXY MASTIC PAINT TO BE APPLIED IN TWO LAYERS, EACH LAYER OF THICKNESS 100 MICRONS DFT OF APPROVED COLOR. (JOTAMASTIC 90 OR APPROVED EQUIVALENT.)
    d. 2ND COAT (TOP COAT): TWO COMPONENTS POLYURETHANE ENAMEL OF 60 MICRON DFT OF APPROVED COLOR APPLIED AFTER ERECTION. (HARDTOP XP OR APPROVED EQUIVALENT.)
15. THE CONTRACTOR SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES AND/OR AMBIGUITIES ON THE DESIGN DRAWINGS IN TIME TO PREVENT ANY FABRICATION ERRORS.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DIMENSIONS AND DESIGN OF ALL CONNECTIONS AND DETAILS FOR CORRECT FITTING OF STRUCTURAL MEMBERS. CORRECT ALIGNMENT AND FIT-UP OF ALL MEMBERS, AND MATCHING OF ALL BOLT HOLES, SHALL BE ENSURED THROUGH DRILLING HOLES IN MEMBERS AT A JOINT TOGETHER AND SHOP ASSEMBLIES BEFORE THE MEMBERS ARE TRANSPORTED TO THE SITE.
17. NO MATERIAL SHALL BE USED FOR FABRICATION UNTIL ITS CONFORMANCE WITH SPECIFIED STANDARD HAS BEEN ENSURED THROUGH LABORATORY TESTS. SAMPLING AND FREQUENCY OF TESTS SHALL BE AS PER SPECIFIED STANDARD AND/OR AS DIRECTED BY THE ENGINEER. HOWEVER, NOT LESS THAN TWO SAMPLES PER SIZE SHALL BE TESTED FROM EACH LOT. SAMPLES MUST REPRESENT THE LOT, FROM WHICH FABRICATION IS TO TAKE PLACE.
18. QUALITY OF WELDS SHALL BE ENSURED BY VISUAL INSPECTION AND TESTS AS PER JOB SPECIFICATIONS BEFORE THE WELDED MEMBERS ARE TRANSPORTED TO THE SITE.
19. SIZES, CENTRE-TO-CENTRE AND EDGE DISTANCES OF BOLT HOLES, AND TOLERANCES THEREON, SHALL BE AS PER SPECIFIED STANDARD. THE SPECIFIED TOLERANCES ARE ON INDIVIDUAL HOLE POSITION AND ARE NOT CUMULATIVE.
20. NO BOLT TIGHTENING OR WELDING SHALL BE PERFORMED UNTIL AS MUCH OF THE STRUCTURE AS WILL BE STIFFENED THEREBY HAS BEEN PROPERLY ALIGNED.
21. ALL CHEMICAL BOLTS SHALL BE FIXED WITH HILTI HIT RE 500 V3 EPOXY MORTAR OR EQUIVALENT. ALL REQUIREMENT/SPECIFICATIONS SHALL BE FOLLOWED AS PER SUPPLIER.
22. ALL WELDS SHALL HAVE 100% VISUAL INSPECTION PERFORMED AS PER AWS D1.1
23. CONTRACTOR SHALL CARRY OUT NON-DESTRUCTIVE TESTING OF ALL BUTT WELDS SUBJECT TO TENSILE STRESSES. TESTING SHALL BE CARRIED OUT IN FABRICATION SHOP OR ON SITE AS THE CASE MAY BE.
24. THE FOLLOWING NON-DESTRUCTIVE EVALUATION (NDE) IS REQUIRED FOR STRUCTURAL WELDING:
    a. 5% OF THE TOTAL NUMBER OF FULL PENETRATION WELDS SHALL BE ULTRASONICALLY EXAMINED(UT) FOR THEIR ENTIRE LENGTH.
    b. 5% OF THE TOTAL NUMBER OF FILLET OR PARTIAL PENETRATION WELDS SHALL BE MAGNETIC PARTICLE EXAMINED (MT). 100% OF THE ENTIRE LENGTH OF THE WELD(S) SELECTED IF ANYWHERE ONE WELD LINE MEET ANOTHER WELD LINE, THAT LOCATION SHALL BE ONE OF THE SELECTED.
    c. WHEN A SELECTED WELD IS REJECTED, TWO ADDITIONAL WELDS SHALL BE SUBJECT TO NDE. THIS PROCEDURE OF EXAMINING TWO WELDS FOR EVERY WELD REJECTED SHALL CONTINUE UNTIL ALL WELDS EXAMINED ARE ACCEPTED. THE REPLACED WELDS SHALL ALSO BE EXAMINED.

G. ABBREVIATIONS & SYMBOLS

@	AT THE RATE OF
B OR BOT.	BOTTOM
BW	BOTHWAYS
c/c	CENTRE TO CENTRE
CL	CLEAR
D,d	DEPTH, THICKNESS
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION
EQ.	EQUAL
FF	FAR FACE
FFL	FINISHED FLOOR LEVEL
FGL	FINISHED GROUND LEVEL
SOG	SLAB ON GRADE
NF	NEAR FACE
NGL	EXISTING/NATURAL GROUND LEVEL
NSP	NOT SHOWN ON PLAN
NTS	NOT TO SCALE
ST	STIRRUPS
T	TOP
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
≥	GREATER THAN OR EQUAL TO
≤	LESS THAN OR EQUAL TO
Ø	DIAMETER IN MILLIMETER UNO
	LEVEL ON PLAN
℄	CENTRE LINE
L	ANGLE
[	CHANNEL

ISSUED FOR BIDDING

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
13TH FLOOR NICL BUILDING, ABBASI SHAHEED ROAD
OFF SHAHRA-E-FAISAL, KARACHI

REV.	DATE	DESCRIPTION
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0	JULY,2026	ISSUED FOR BIDDING

DRAWN BY	TARIQ SHAH
DESIGNED BY	MRK
CHECKED BY	NP
APPROVED BY	

PROJECT: PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
GENERAL NOTES

SCALE: AS SHOWN
DRAWING NO. 4344/SOT/BD/03C001
REVISION: 0

METHODOLOGY OF REPAIR WORKS

A. GENERAL METHODOLOGY OF REPAIR

ALL DETAILS GIVEN IN THE DRAWINGS FOR DISMANTLING AND REPAIR WORKS ARE SCHEMATIC. THE CONTRACTOR SHALL CARRYOUT THEIR OWN ASSESSMENT AND QUANTIFICATION OF DETERIORATED SURFACES AND SHALL PREPARE AND SUBMIT A COMPLETE METHODOLOGY AND THE SEQUENCE OF WORK INCLUDING DISMANTLING, REMOVAL OF DETERIORATED CONCRETE, CLEANING OF EXISTING CORRODED STEEL, FIXING OF SUPPLEMENTAL STEEL & APPLICATION OF CHEMICALS, FORMWORK AND SHORING ETC FOR ENGINEER'S REVIEW AND APPROVAL. THE SCHEME FOR REPAIR WORKS TO BE CARRIED OUT IS AS UNDER.

1. SITE CONSTRAINTS/CHALLENGES

THE CONTRACTOR MUST BE AWARE OF AND FORESEE THE CHALLENGES DURING IMPLEMENTING THE REPAIR WORKS. SOME OF THEM BUT NOT LIMITED TO, ARE GIVEN BELOW.

– THE TIDAL VARIATION (DAILY AND SEASONAL) MAY SHORTEN THE WORKING TIME BENEATH THE JETTY AND AT APPROACH BRIDGES.

– WET AND DRY CYCLE DUE TO TIDAL VARIATION.

– SHORING FROM SEABED MAY BE DIFFICULT HENCE CONTRACTOR TO LOOK FOR ALTERNATE SHORING METHODS TO RELEASE STRUCTURE MEMBERS UNDER DISMANTLING AND REPAIR.

– REQUIREMENT OF WATER TIGHT FORMWORK FOR FORM CAST REPAIRS.

2. TEMPORARY SUPPORT FOR EXISTING MEMBERS

ALL ELEMENTS TRANSFERRING LOAD TO THE AFFECTED MEMBERS (FOR EXAMPLE PLANKS IN CASE OF REPAIR ON BEAMS) SHALL BE ADEQUATELY SUPPORTED DURING THE DISMANTLING & REPAIR WORKS. THE CONTRACTOR SHALL DESIGN SUPPORTING/SHORING SYSTEM INCLUDING WORKING PLATFORM FOR ELEMENTS UNDER DISMANTLING AND REPAIR. THE DESIGN CALCULATION OF THE SUPPORTING SYSTEM AND PLATFORM SHALL BE SUBMITTED TO THE ENGINEER FOR THEIR REVIEW AND APPROVAL.

3. ASSESMENT OF DETERIORATION

THE CONTRACTOR SHALL CARRYOUT DETAILED SURVEY OF THE SITE AND ASSESS DETERIORATIONS OF EXISTING ELEMENTS TO UNDERSTAND THE REPAIR WORKS AND PREPARE APPLICABLE METHODOLOGY.

4. IDENTIFICATION OF DETERIORATED CONCRETE SURFACES

ALL THE DETERIORATED SURFACES OF BEAMS, PILE HEADS, PLANKS, DECK AND SERVICE CHANNELS SHALL BE IDENTIFIED AND MARKED ON THE DRAWINGS. THE AREA OF DETERIORATED CONCRETE SURFACES AND DEPTHS OF DETERIORATION SHALL BE DETERMINED BY THE CONTRACTOR FOR QUANTIFICATION. DRAWINGS SHOWING DETERIORATED SURFACES AND CALCULATED AREAS AND DEPTHS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW & APPROVAL FOR FURTHER PROCEEDING WITH THE WORK.

5. REMOVAL OF DETERIORATED CONCRETE AND EXPOSING OF REBARS

DETERIORATED CONCRETE SHALL BE DISMANTLED / REMOVED. EXISTING STEEL REBARS SHALL BE EXPOSED ALL AROUND BY PROVIDING 25 mm UNDERCUT BEHIND THE REBARS.

REMOVAL OF THE DAMAGED CONCRETE SHALL BE CARRIED OUT WITH GREAT CARE SO THAT THE MEMBER UNDER DISMANTLING AND OTHER ADJACENT STRUCTURAL ELEMENT ARE NOT AFFECTED / DAMAGED.

CONCRETE SURFACE, WHERE DETERIORATION IS NOT UNIFORM AND IN PORTIONS, DETERIORATED SURFACE SHALL BE REMOVED WHEREVER APPLICABLE. SOME PORTION OF UN DAMAGED CONCRETE SHALL BE REMOVED TO EXPOSE UNDAMAGED PORTION OF STEEL ALSO IN ORDER TO JOIN NEW STEEL WITH THE EXISTING UN-DAMAGED / UN CORRODED STEEL.

ALL THE REMOVAL OF CONCRETE SHALL BE CARRIED OUT BY HAND CHISELING WITH A MANUALLY OPERATED ELECTRIC CHISELLER OR A MANUAL CHISEL WITHOUT DAMAGING THE UN-DETERIORATED CONCRETE AND EXISTING REINFORCEMENT.

THE DISMANTLING WORK SHALL NOT BE CARRIED SIMULTANEOUSLY IN ALL THE SPANS OF A BEAM. THE SEQUENCE OF DISMANTLING WORK SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.

NO HAMMERING SHALL BE ALLOWED FOR DISMANTLING WORKS.

6. REMOVAL OF RUST / CLEANING OF RUSTED REBARS

AFTER THE REMOVAL OF DAMAGED CONCRETE AND PORTION OF UNDAMAGED CONCRETE, THE EXPOSED SURFACE OF EXISTING UNDAMAGED CONCRETE SHALL BE CLEANED WITH POTABLE WATER JET AND EXISTING REINFORCEMENT SHALL BE CLEANED BY APPLICATION OF SAND BLASTING AND/OR STEEL WIRE POWER BRUSH TOOL.

7. PROTECTION OF EXISTING REINFORCEMENT

ANY RUST PRIMER (CORRAPHEN BY CORTEC CORPORATION OR X-PREST RUST REMOVER BY X-CALIBUR OR APPROVED EQUIVALENT) SHALL BE THOROUGHLY APPLIED ON THE CLEANED AND DRY REBARS. APPLICATION OF ABOVE CHEMICAL SHALL BE CARRIED OUT AS PER METHODOLOGY AND SPECIFICATIONS OF ITS MANUFACTURER.

8. ANCHORAGE OF NEW STEEL

IN CASE OF DAMAGE TO ANY OF THE EXISTING STEEL BARS, OR IF THERE IS A LOSS OF STEEL DUE TO CORROSION GREATER THAN OR EQUAL TO 25% OF THE ORIGINAL CROSS SECTIONAL AREA OF REBAR, THE DAMAGED BAR SHALL BE SUPPLEMENTED WITH A NEW SUPPLEMENTAL REBAR OF SAME SIZE AND EQUIVALENT STRENGTH AND FIXED WITH EPOXY BASED CHEMICAL ANCHOR (HILTI HIT RE-500 OR FISCHER FIS-EM PLUS OR APPROVED EQUIVALENT) AS PER CONDITION AT SITE, WITH APPROVAL OF ENGINEER.

9. FIXING OF SHEAR CONNECTORS

SHEAR CONNECTORS / DOWELS SHALL BE DRILLED AND FIXED WITH APPROVED EPOXY CHEMICAL AT SPECIFIED SPACINGS TO PROVIDE CONNECTION BETWEEN OLD AND NEW CONCRETE.

10. FIXING OF FORMWORK AND CASTING OF NEW CONCRETE

ALL THE NEW CONCRETE SHALL BE FAIR FACE CONCRETE HENCE, THE FORMWORK SHALL BE SELECTED & FIXED ACCORDINGLY. DUE TO TIDAL VARIATIONS ALL FORMWORK SHALL BE WATER TIGHT.

ALL STRUCTURAL REPAIR CONCRETE SHALL BE CLASS-A2 SELF CONSOLIDATING CONCRETE (SCC) WITH REDUCED AGGREGATE SIZE 10mm DOWN USING HIGH PERFORMANCE, HIGH RANGE SUPER PLASTICIZER BASED ON POLYCARBOXYLIC ETHER (SIKA VISCOCRETE-3SHF-PK OR XTREME XPAADE 55 BY X-CALIBUR OR APPROVED EQUIVALENT) TO BE PUMPED. A MIGRATING CORROSION INHIBITING ADMIXTURE (MCI 2005 BY CORTEC CORPORATION OR FERROGARD 901 BY SIKA OR X-MIX CN BY X-CALIBUR OR APPROVED EQUIVALENT) SHALL BE ADDED IN THE CONCRETE AS PER MANUFACTURER'S SPECIFICATIONS. SILICA FUME AND FLY ASH SHALL BE ADDED IN THE CONCRETE AS SUPPLEMENTARY CEMENTITIOUS MATERIALS IN THE APPROVED PROPORTIONS FOR DURABILITY AND IMPERMEABILITY OF CONCRETE. MIX DESIGN SHALL BE CARRIED OUT BY THE CONTRACTOR INCLUDING ALL OF THE ABOVE ADDITIVES AND TEST RESULTS OF THE CYLINDERS IN TERMS OF STRENGTH AND PERMEABILITY ALONG WITH SLUMP RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO USE OF THIS CONCRETE.

11. APPLICATION OF WATER REPELLENT

A SILANE BASED WATER REPELLENT (SIKAGARD 700-S OR X-SHIELD FLUROSIL 100 BY X-CALIBUR OR APPROVED EQUIVALENT) SHALL BE APPLIED ON SURFACES OF BEAMS, PILE HEADS AND BOTTOM OF PLANKS/DECK AFTER CURING OF NEWLY PLACED CONCRETE AS PER MANUFACTURER'S RECOMMENDATION. NOTE THAT CURING COMPOUND SHALL NOT BE USED ON CONCRETE SURFACES WHERE A HYDROPHOBIC AGENT IS TO BE APPLIED.

12. REPLACEMENT OF STEEL LADDER

ALL DETERIORATED/DAMAGED LADDERS SHALL BE REPLACED WITH NEW STEEL LADDERS AS PER ORIGINAL (EXISTING) DESIGN DRAWINGS. NEW LADDER SHALL BE FIXED WITH EPOXY CHEMICAL ANCHORS HILTI HIT RE-500 OR FISCHER FIS EM PLUS OR APPROVED EQUIVALENT. CONTRACTOR SHALL PREPARE SHOP DRAWINGS INCLUDING FIXING OF STEEL LADDERS WITH EXISTING STRUCTURES AND SUBMIT IT TO THE ENGINEER FOR REVIEW AND APPROVAL.

B. REPAIR OF PLANKS AND PILE HEAD

PATCH SHALL BE CARRIED OUT FOR LOCALLY DETERIORATED PORTIONS OF PLANKS/DECK, PILE HEAD AS SHOWN IN DRAWINGS. APPLICATION OF ALL THE CHEMICAL MENTIONED IN THE DRAWINGS SHALL BE APPLIED AS PER MANUFACTURERS SPECIFICATIONS.

C. ADDITIONAL NOTES FOR APPROACH BRIDGES

1. SEQUENCE OF REPAIR WORK

THE REPAIR WORKS SHALL BE EXECUTED ON APPROACH BRIDGE 1 AND APPROACH BRIDGE 2 SEPARATELY. BOTH THE BRIDGES SHALL NOT BE REPAIRED SIMULTANEOUSLY.

2. REMOVAL OF EXISTING TOP SURFACE ON APPROACH BRIDGES

TOP SURFACE (IF ANY), SERVICE CHANNEL AND OTHER CONNECTING ELEMENTS SUCH AS EXPANSION JOINTS, SIDE RAIL ETC. SHALL BE REMOVED OR DISMANTLED WITHOUT DAMAGING THE TOP SLAB, PLANKS, TRANSOMS/BEAMS AND THEIR REINFORCEMENT, PILE CAPS, PILES AND OTHER CONNECTING ELEMENTS AND UTILITIES LINES BELOW DECK.

3. IDENTIFICATION OF DETERIORATED PLANKS

ALL THE DAMAGED/DETERIORATED PLANKS SHALL BE IDENTIFIED AND MARKED ON THE DRAWINGS AS DAMAGED/DETERIORATED AND GOOD CONDITIONS FOR QUANTIFICATION. DRAWINGS SHOWING CONDITION OF PLANKS AND CALCULATED QUANTITIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW & APPROVAL FOR FURTHER PROCEEDING WITH THE WORK.

4. REMOVAL OF DETERIORATED PLANKS FROM APPROACH BRIDGES

ALL DAMAGED/DETERIORATED PLANKS ON APPROACH BRIDGES SHALL BE REMOVED WITH ITS TOP SLAB BY USING SAW ROAD CUTTER TO ISOLATE THE TOP SLAB FROM ITS SURROUNDING, WITHOUT DAMAGING THE PLANKS, TRANSOMS/BEAMS AND THEIR REINFORCEMENT, PILE CAPS, PILES AND OTHER CONNECTING ELEMENTS AND UTILITY LINES BELOW DECK. TOP SLAB (OR PART OF CONCRETE) OVER TRANSOM/BEAM SHALL ALSO BE REMOVED AT THE LOCATION OF REMOVED PLANKS AS SHOWN IN DRAWINGS. EXISTING REINFORCEMENT OF TRANSOM SHALL BE KEPT INTACT.

5. TEMPORARY SUPPORT FOR UTILITIES AND OTHER ELEMENTS

PROVIDE TEMPORARY SUPPORT FOR EXISTING UTILITIES LINES, POLES AND OTHER ELEMENTS REQUIRED TO BE RETAINED BY THE CLIENT THROUGHOUT THE PERIOD OF REPAIR/RECONSTRUCTION.

6. REPAIR OF PILE HEAD/TRANSOMS OF APPROACH BRIDGES

REPAIR PILE HEAD/TRANSOMS OF APPROACH BRIDGES AS PER PROVIDED SCHEME FOR UNLOADING JETTY BEAMS AS MENTIONED IN GENERAL METHODOLOGY AND AS SHOWN IN DRAWINGS.

7. RECONSTRUCTION AND PLACEMENT OF PLANKS

NEW PRECAST PLANKS SHALL BE CONSTRUCTED IN REPLACEMENT OF DAMAGED/DETERIORATED PLANKS AND PLACED OVER REPAIRED TRANSOMS AS SHOWN IN DRAWINGS. ALL STRUCTURAL CONCRETE FOR PRECAST PLANKS SHALL BE CLASS-A2 CONCRETE WITH AGGREGATES 19mm DOWN USING POLYCARBOXYLATE ETHER BASED SUPERPLASTICIZER (SIKA VISCOCRETE-3S HT-PK OR XTREME XPAADE BY X-CALIBUR OR APPROVED EQUIVALENT). SILICA FUME & FLY ASH SHALL BE APPLIED IN THE CONCRETE AS SUPPLEMENTARY MATERIALS IN THE APPROVED PROPORTIONS FOR DURABILITY AND IMPERMEABILITY. A MIGRATING CORROSION INHIBITING ADMIXTURE (MCI 2005 BY CORTEC CORPORATION OR FERROGARD 901 BY SIKA OR X-MIX CN BY X-CALIBUR OR APPROVED EQUIVALENT) SHALL BE ADDED IN THE CONCRETE. MIX DESIGN SHALL BE CARRIED OUT BY THE CONTRACTOR INCLUDING ALL OF THE ABOVE ADDITIVES AND TEST RESULTS OF THE CYLINDERS IN TERM OF STRENGTH AND PERMEABILITY ALONG WITH SLUMP RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

8. RECASTING OF SLAB AND SERVICES CHANNEL ON APPROACH BRIDGES

TOP SLAB OVER REPLACED PLANKS, TOP SLAB (PART OF CONCRETE) OVER TRANSOM AND SERVICE CHANNEL SHALL BE CAST AS PER EXISTING LAYOUT AND AS SHOWN IN DRAWINGS.

ALL STRUCTURAL CONCRETE FOR CAST IN-SITU SLAB & SERVICE CHANNEL SHALL BE CLASS-A2 CONCRETE WITH AGGREGATES 19mm DOWN USING POLYCARBOXYLATE ETHER BASED SUPERPLASTICIZER (SIKA VISCOCRETE-3S HT-PK OR XTREME XPAADE BY X-CALIBUR OR APPROVED EQUIVALENT). SILICA FUME & FLY ASH SHALL BE APPLIED IN THE CONCRETE AS SUPPLEMENTARY MATERIALS IN THE APPROVED PROPORTIONS FOR DURABILITY AND IMPERMEABILITY. A MIGRATING CORROSION INHIBITING ADMIXTURE (MCI 2005 BY CORTEC CORPORATION OR FERROGARD 901 BY SIKA OR X-MIX CN BY X-CALIBUR OR APPROVED EQUIVALENT) SHALL BE ADDED IN THE CONCRETE. MIX DESIGN SHALL BE CARRIED OUT BY THE CONTRACTOR INCLUDING ALL OF THE ABOVE ADDITIVES AND TEST RESULTS OF THE CYLINDERS IN TERM OF STRENGTH AND PERMEABILITY ALONG WITH SLUMP RESULTS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL.

9. HAND RAILS

EXISTING HAND RAILS SHALL BE RE-FIXED AT TOP OF THE APPROACH BRIDGE AS PER EXISTING DRAWINGS AND SITE CONDITIONS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING HAND RAILS ALONG WITH ALL ACCESSORIES LIKE BASE PLATE, ANCHOR BOLTS AND THEIR FIXING DETAILS FOR THE ENGINEER'S REVIEW AND APPROVAL.

10. EXPANSION JOINT

EXISTING EXPANSION JOINTS SHALL BE RE-FIXED AT APPROACH BRIDGES AS PER EXISTING DRAWINGS AFTER REPLACING OF ANY OF ITS COMPONENTS AS PER REQUIREMENT AND SITE CONDITIONS. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS SHOWING THE EXPANSION JOINTS ALONG WITH ITS FIXING DETAILS FOR THE ENGINEER'S REVIEW AND APPROVAL BEFORE EXECUTION OF WORK.

ISSUED FOR BIDDING

KORANGI FISHERIES HARBOUR AUTHORITY MINISTRY OF MARITIME AFFAIRS GOVERNMENT OF PAKISTAN	NESPAK NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. 13TH FLOOR NICL BUILDING, ABBASI SHAHEED ROAD OFF SHAHRA-E-FAISAL, KARACHI	3			DRAWN BY	TARIQ SHAH
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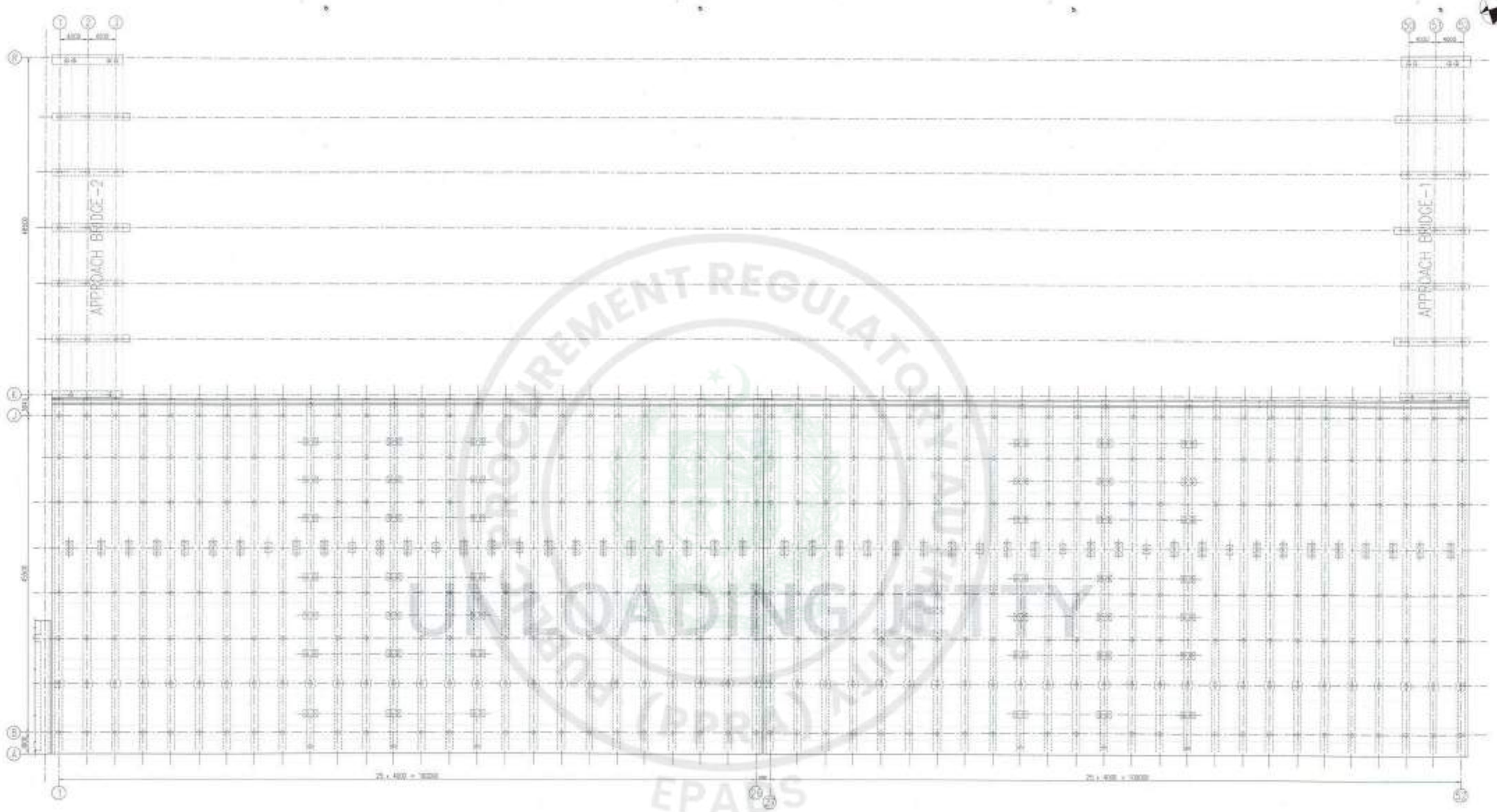
		0	JULY,2026	ISSUED FOR BIDDING	APPROVED BY	
		REV.	DATE	DESCRIPTION		

PROJECT: PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE	REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES REPAIR METHODOLOGY	SCALE AS SHOWN
DRAWING NO.	4344/501/BD/030002	REVISION 0



GENERAL LAYOUT PLAN
SCALE 1:1000

NOTES
1. FOR GENERAL NOTES REFER DWG NO.4344/SOT/00/030001
2. FOR METHODOLOGY OF REPAIR REFER DWG NO.4344/SOT/00/030002

ISSUED FOR BIDDING

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
13TH FLOOR NICL BUILDING, ABBASS SHAHEED ROAD
OFF SHAHRA-E-FAISAL, KARACHI

REV.	DATE	DESCRIPTION
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DRAWN BY: TARIQ SHAH
DESIGNED BY: NSL
CHECKED BY:
APPROVED BY:

PROJECT: PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
GENERAL LAYOUT PLAN

SCALE: AS SHOWN
REVISION: 0

DRAWING NO: 4344/SOT/00/030003

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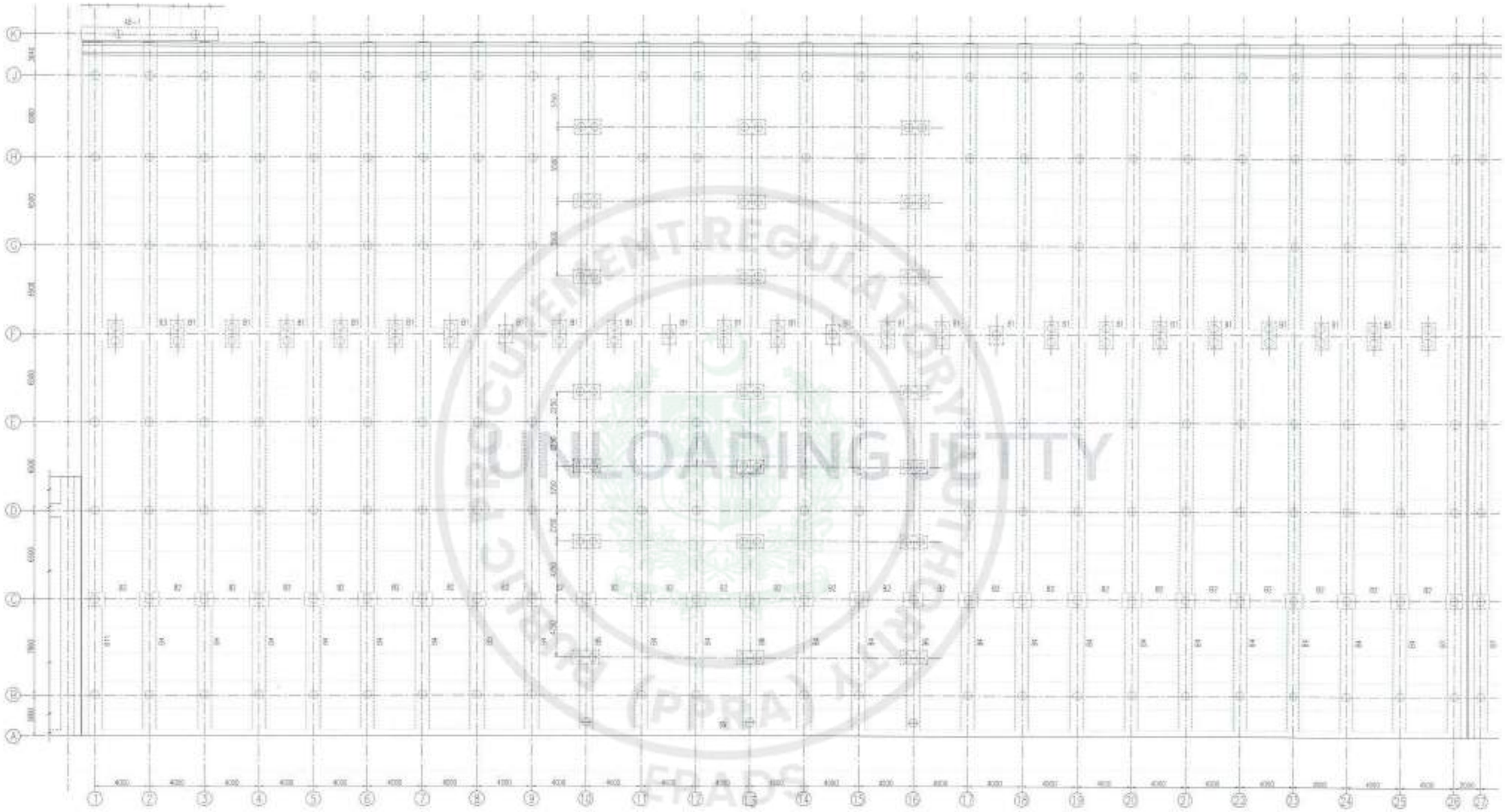

LAYOUT PLAN OF EXISTING UNLOADING JETTY
SCALE 1:150

ISSUED FOR BIDDING

NOTES
1. FOR GENERAL NOTES REFER DWG. NO.4344/SOT/BD/030001
2. FOR METHODOLOGY OF REPAIR REFER DWG. NO.4344/SOT/BD/030002

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
13TH FLOOR NICL BUILDING, ABBASI SHAHEED ROAD
OFF SHAHRA-E-FAISAL, KARACHI

REV.	DATE	DESCRIPTION
3		
2		
1		
0	JULY,2024	ISSUED FOR BIDDING

DRAWN BY: TARIQ SHAH
DESIGNED BY:
CHECKED BY:
APPROVED BY:

PROJECT
PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
LAYOUT PLAN OF EXISTING UNLOADING JETTY (SHEET 1 OF 2)

SCALE: AS SHOWN
REVISION: 0
DRAWING NO.: 4344/SOT/BD/030004

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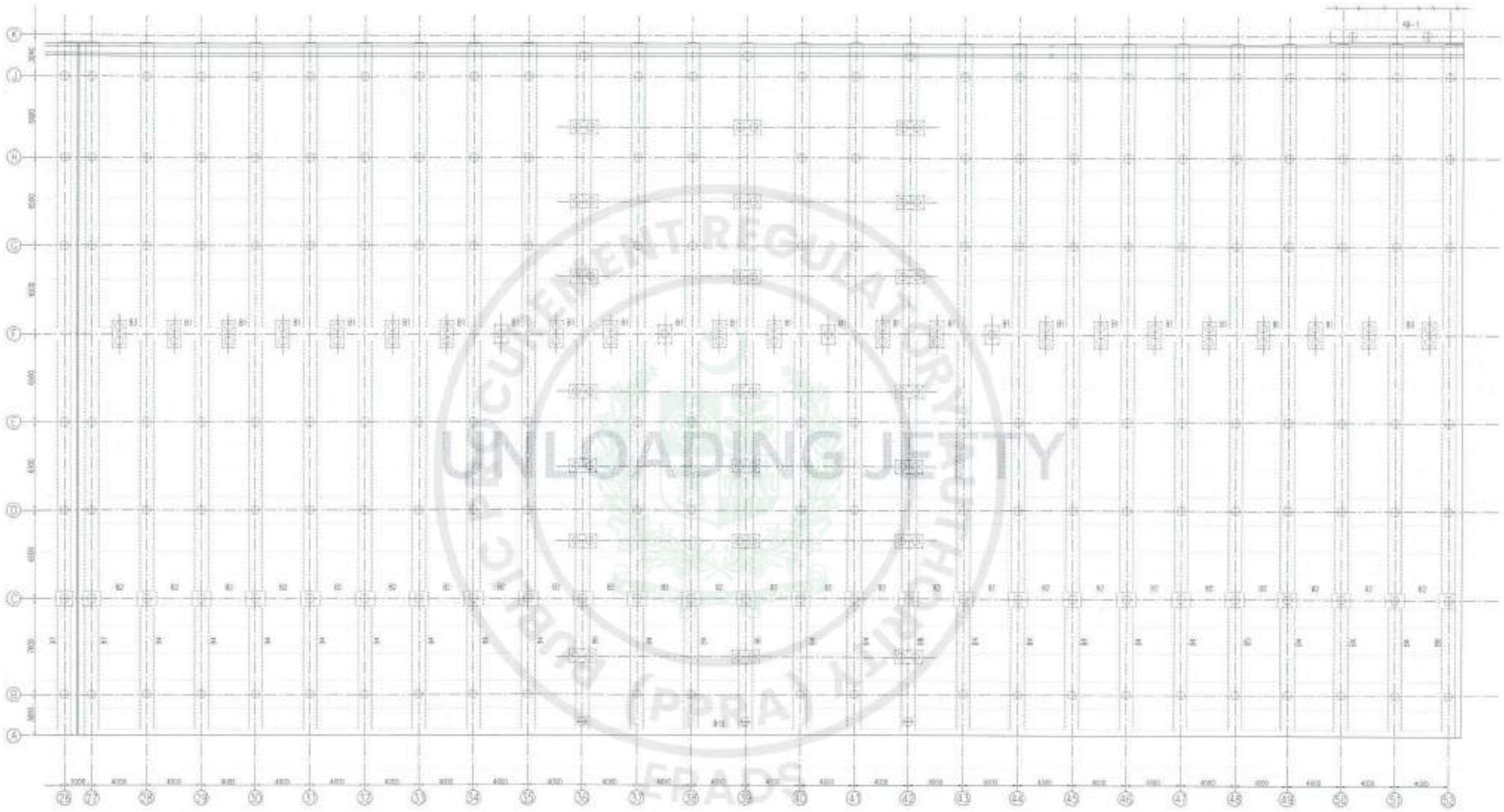


LAYOUT PLAN OF EXISTING UNLOADING JETTY

SCALE 1:150

NOTES

1. FOR GENERAL NOTES REFER DWG. NO.4344/007/BD/030001
2. FOR METHODOLOGY OF REPAIR REFER DWG. NO.4344/007/BD/030002

ISSUED FOR BIDDING

BIDDING DRAWING

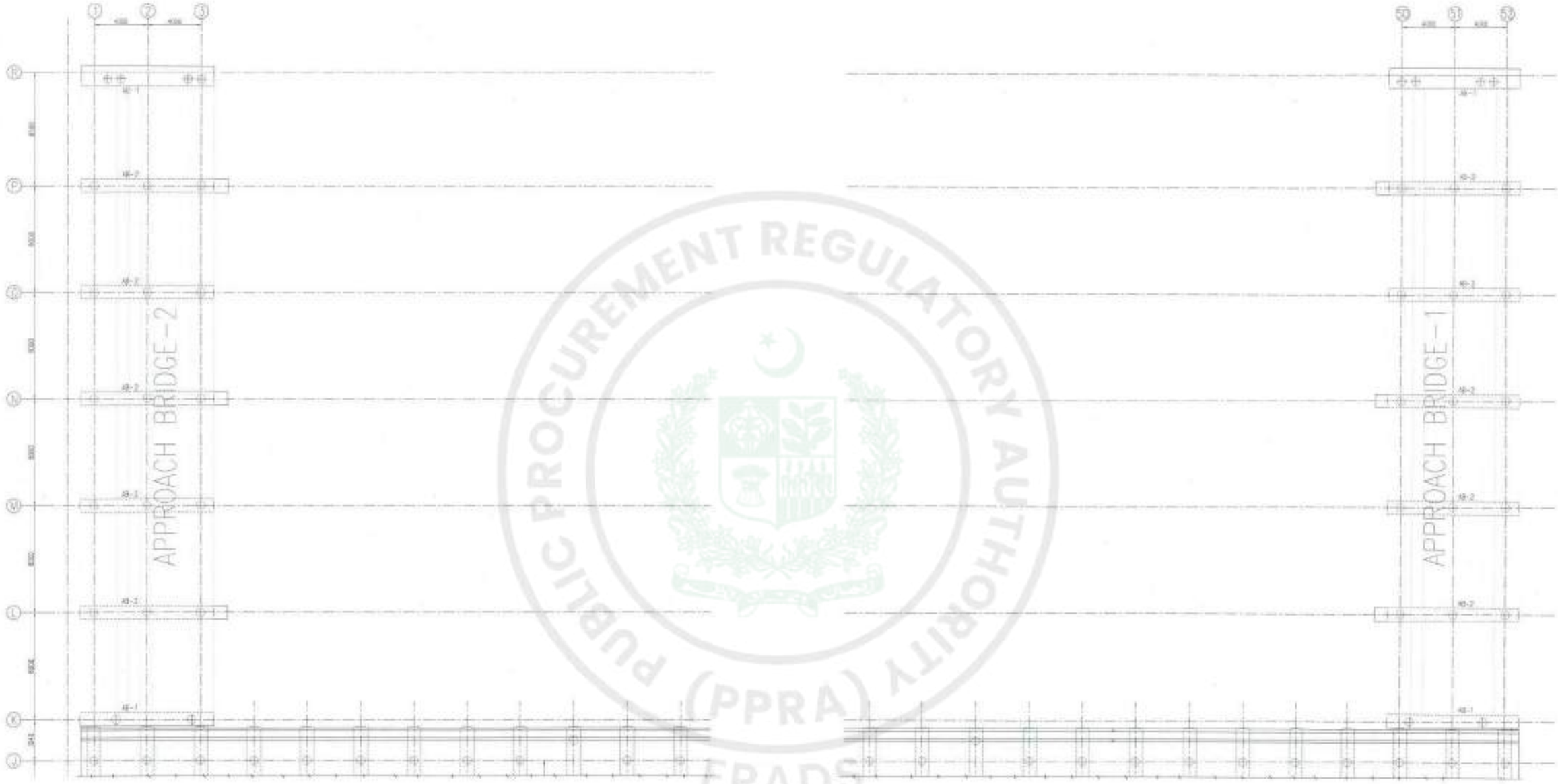
KORANGI FISHERIES HARBOUR AUTHORITY MINISTRY OF MARITIME AFFAIRS GOVERNMENT OF PAKISTAN	NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD. 13TH FLOOR NICL BUILDING, ABBASSI SHAHEED ROAD OFF. SHAHRA-E-FAISAL, KARACHI	3			DRAWN BY	TARIQ SHAH	PROJECT: PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES
		2			DESIGNED BY	MZK	
		1			CHECKED BY		
		0	JULY,2026	ISSUED FOR BIDDING	APPROVED BY		
		REV.	DATE	DESCRIPTION			

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
LAYOUT PLAN OF EXISTING UNLOADING JETTY (SHEET 2 OF 2)

SCALE: AS SHOWN

REVISION: 0

DRAWING NO. 4344/007/BD/030005



LAYOUT PLAN OF EXISTING APPROACH BRIDGES
SCALE 1:150

NOTES
1. FOR GENERAL NOTES REFER DWG NO:4344/SOT/BD/039201
2. FOR METHODOLOGY OF REPAIR REFER DWG NO:4344/SOT/BD/039202

ISSUED FOR BIDDING

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
13TH FLOOR NIC BUILDING, ABBASSI SHAHEED ROAD
OFF SHAHRA-E-FAISAL, KARACHI

REV.	DATE	DESCRIPTION
3		
2		
1		
0	JULY,2024	ISSUED FOR BIDDING

DRAWN BY: TARIQ SHAH
DESIGNED BY: MZK
CHECKED BY:
APPROVED BY: NF

PROJECT:
PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

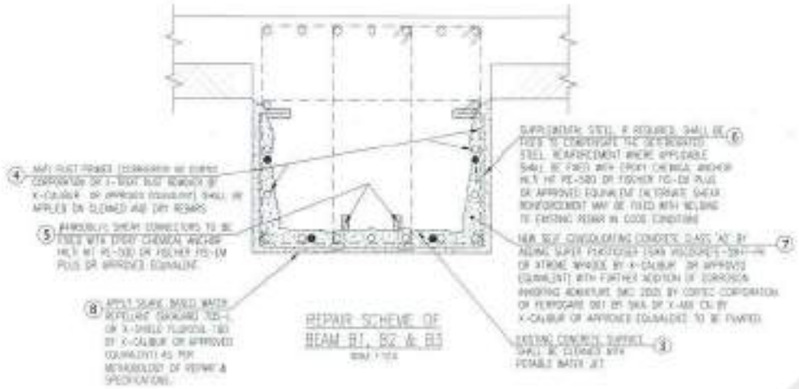
TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
LAYOUT OF EXISTING APPROACH BRIDGES 1 & 2

SCALE: AS SHOWN

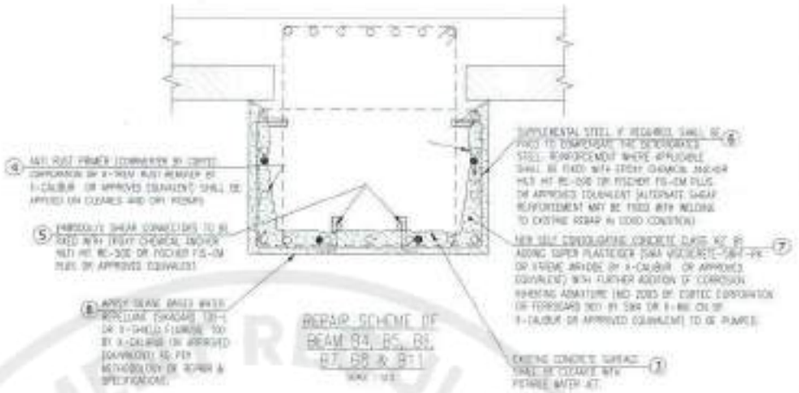
DRAWING NO: 4344/SOT/BD/039606

REVISION: 0

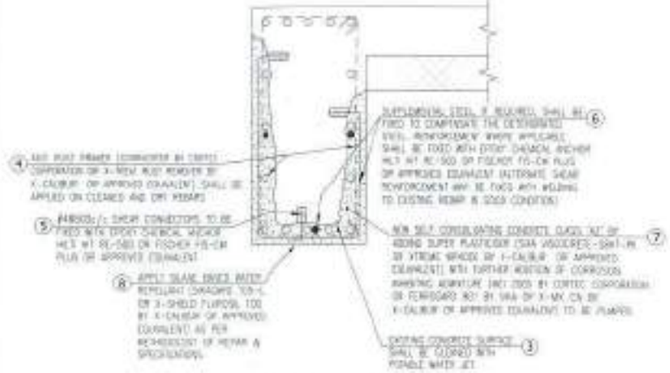
PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS



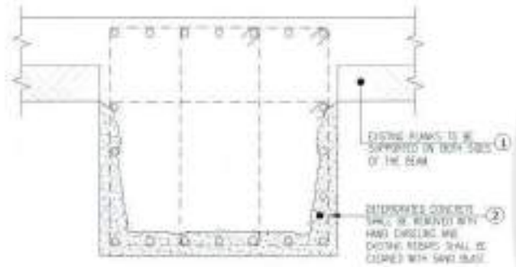
REPAIR SCHEME OF BEAM B1, B2 & B3



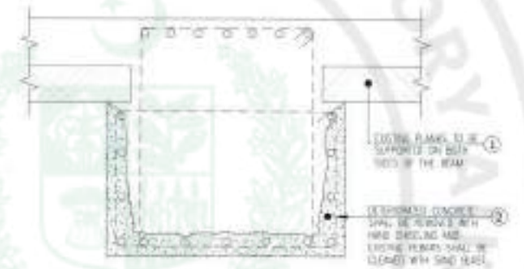
REPAIR SCHEME OF BEAM B4, B5, B6, B7, B8 & B11



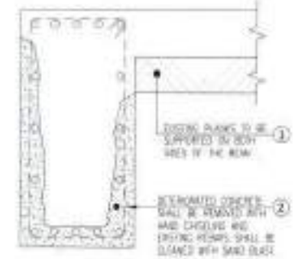
REPAIR SCHEME OF BEAM B9 & B10



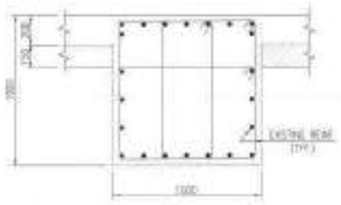
DISMANTLING SCHEME FOR BEAM B1, B2 & B3



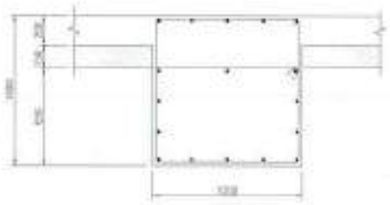
DISMANTLING SCHEME OF BEAM B4, B5, B6, B7, B8 & B11



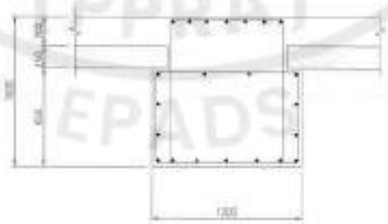
DISMANTLING SCHEME OF BEAM B9 & B10



SECTION OF EXISTING BEAM B1 & B3



SECTION OF EXISTING BEAM B2



SECTION OF EXISTING BEAMS B4, B5, B6, B7, B8 & B11

SECTION OF EXISTING BEAM B9 & B10

ISSUED FOR BIDDING

NOTES:
1. FOR GENERAL NOTES REFER DWG NO.4344/SOT/BD/030001.
2. FOR METHODOLOGY OF REPAIR REFER DWG NO.4344/SOT/BD/030002.

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
13TH FLOOR NCL BUILDING, ABBASI SHAHEED ROAD OFF SHAHRA-E-FAISAL, KARACHI

REV	DATE	DESCRIPTION
3		
2		
1		
0	JULY,2026	ISSUED FOR BIDDING

DRAWN BY: TARIQ SHAH
DESIGNED BY:
CHECKED BY:
APPROVED BY:

PROJECT: PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
REPAIR SCHEME OF JETTY BEAMS

SCALE: AS SHOWN
REVISION: R0
DRAWING NO.: 4344/SOT/BD/030007

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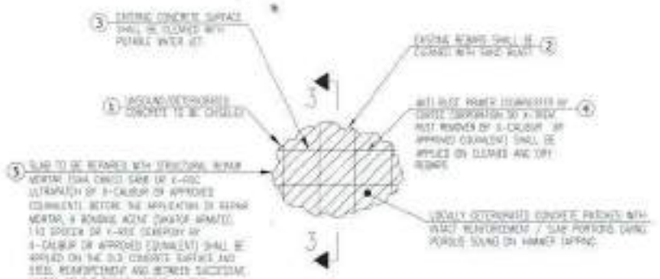
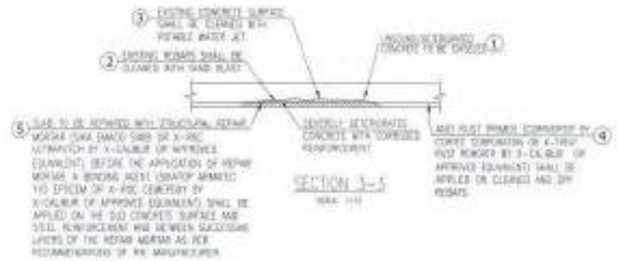
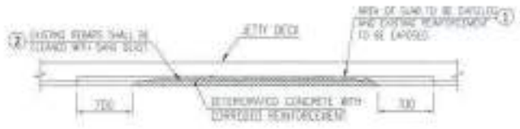


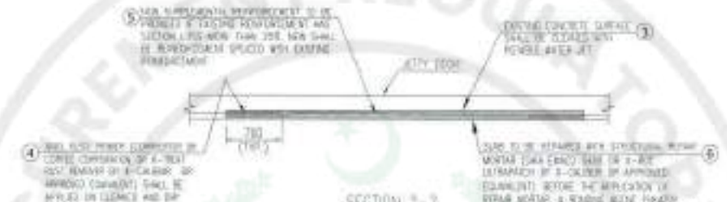
PATCH REPAIR SCHEME FOR LOCALLY DETERIORATED AREAS OF PLANKS, PILE HEADS ETC.



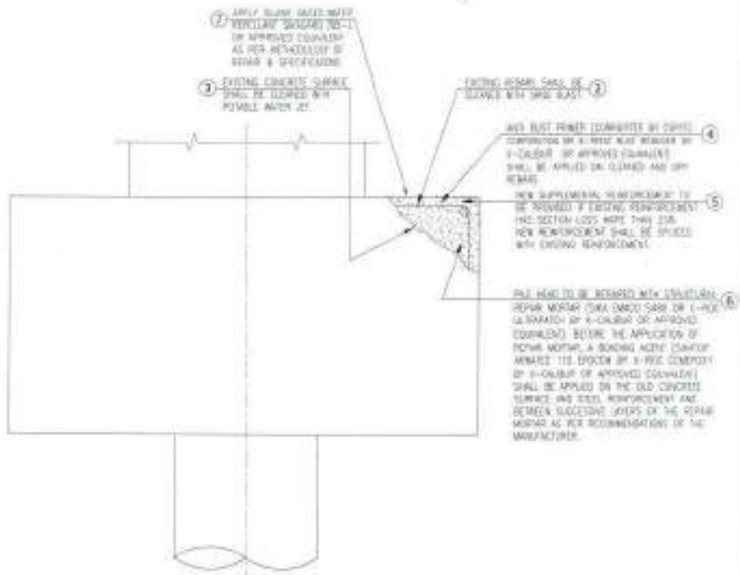
SECTION 3-3



SECTION 1-1

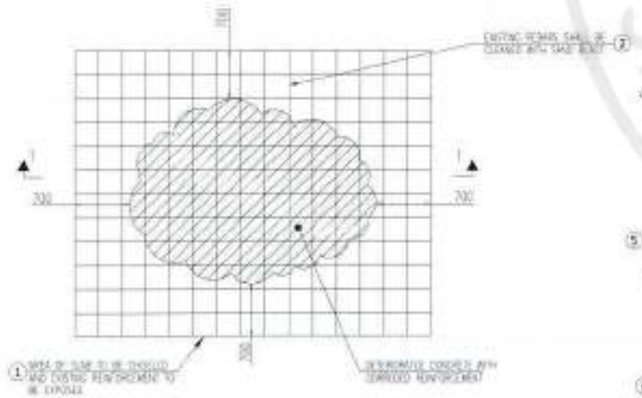


SECTION 2-2

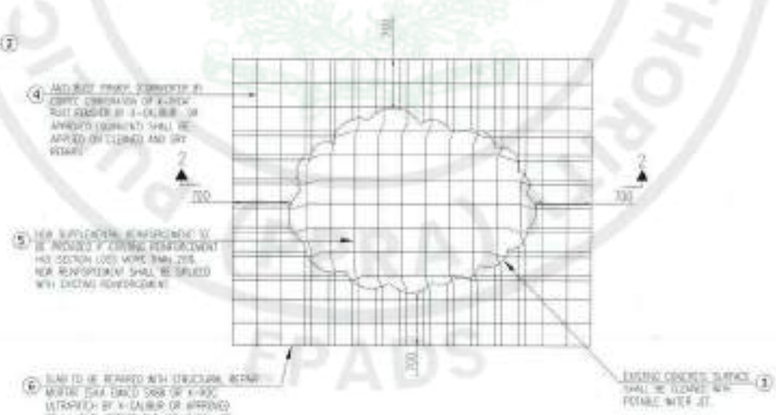


REPAIR SCHEME OF PILE HEAD

DISMANTLING SCHEME OF PILE HEAD



DISMANTLING SCHEME OF DETERIORATED MAJOR PORTION OF PLANK/DECK OF UNLOADING JETTY



REPAIR SCHEME FOR MAJOR PORTION OF PLANK/DECK OF UNLOADING JETTY

ISSUED FOR BIDDING

NOTES
1. FOR GENERAL NOTES REFER DWG. NO.4344/SOT/BD/030001
2. FOR METHODOLOGY OF REPAIR REFER DWG. NO.4344/SOT/BD/030002

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD
13TH FLOOR NICL BUILDING, ABBASSI SHAHEED ROAD OFF SHAHRA-E-FAISAL, KARACHI

REV	DATE	DESCRIPTION
3		
2		
1		
0	JULY,2026	ISSUED FOR BIDDING

DRAWN BY: FARID SHAH
DESIGNED BY: MPK
CHECKED BY:
APPROVED BY: NP

PROJECT: PACKAGE-II : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
PATCH REPAIR SCHEME FOR UNLOADING JETTY

SCALE: AS SHOWN

DRAWING NO: 4344/SOT/BD/030008

REVISION: 0

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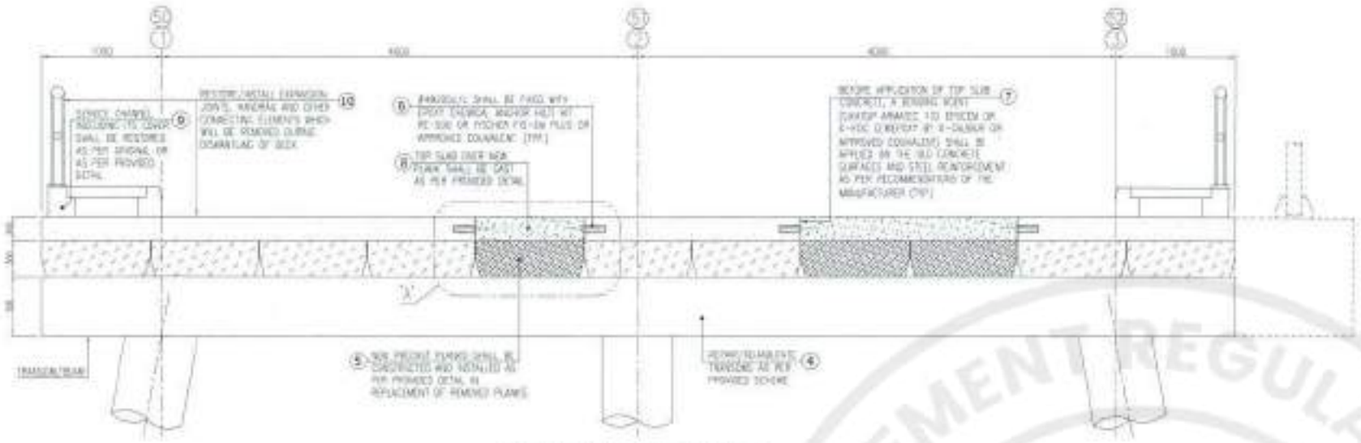
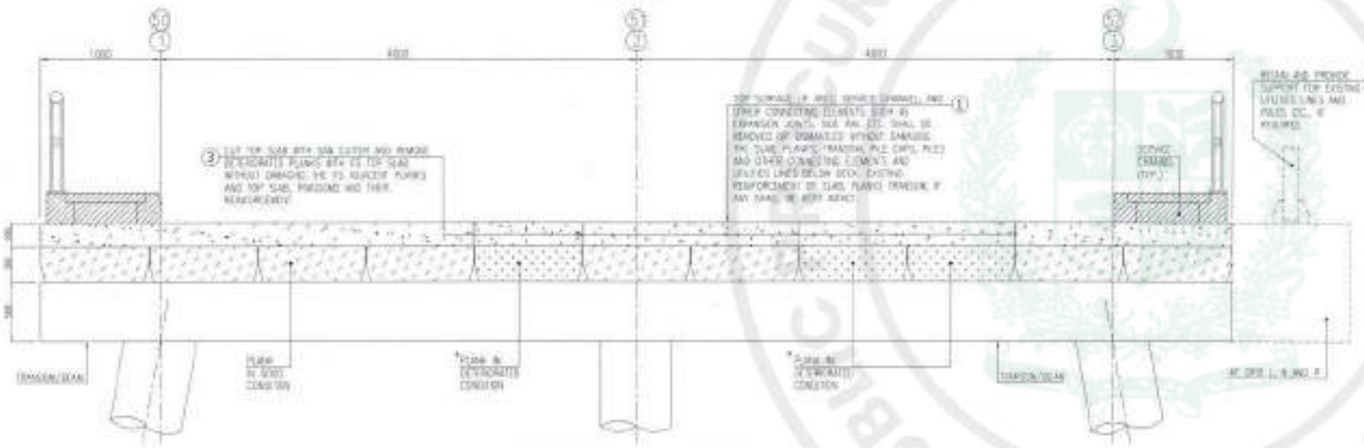
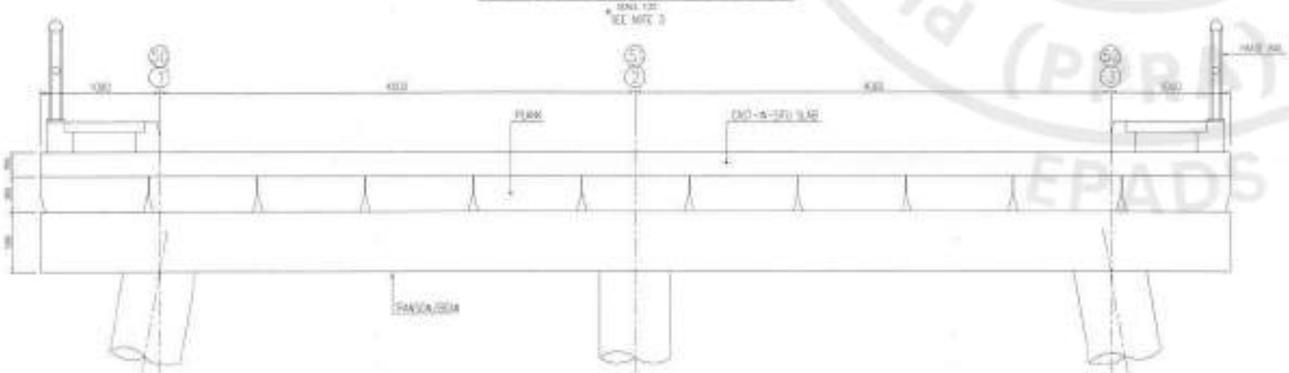


REPAIR SCHEME OF APPROACH BRIDGE

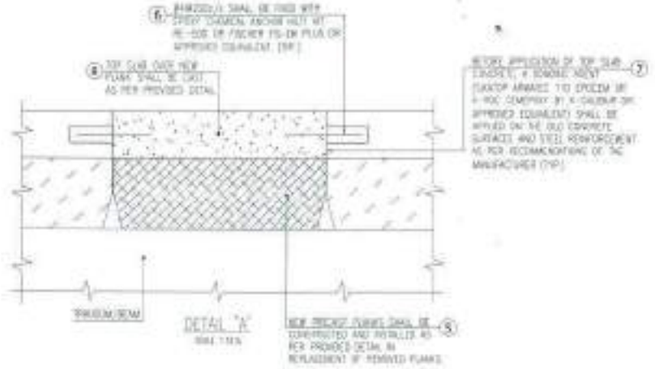


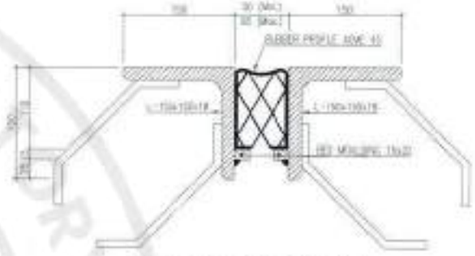
DISMANTLING SCHEME FOR APPROACH BRIDGE



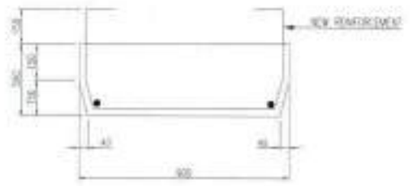
SECTION OF EXISTING APPROCH BRIDGE

TYP. SECTION OF HAND RAILING

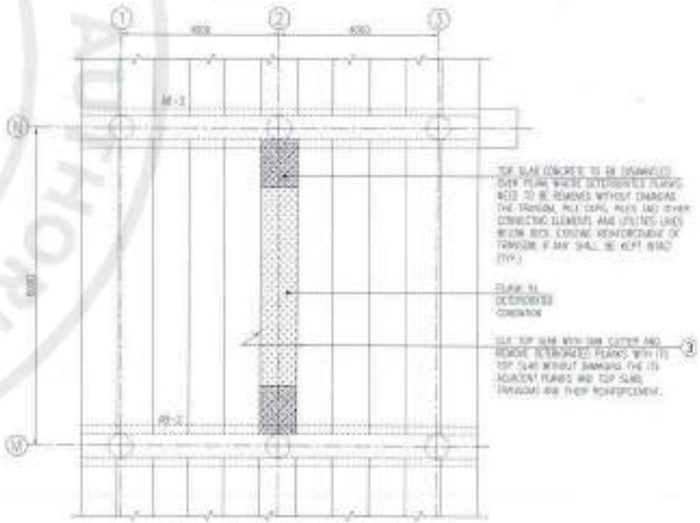




TYP. DETAIL OF EXPANSION JOINT



TYP. SECTION OF PLANK



PART PLAN OF APPROACH BRIDGE

ISSUED FOR BIDDING

NOTES

1. FOR GENERAL NOTES REFER DWG. NO.4344/SOT/BD/030001
2. FOR METHODOLOGY OF REPAIR REFER DWG. NO.4344/SOT/BD/030002
3. FOR IDENTIFICATION OF DETERIORATED PLANKS REFER METHODOLOGY OF REPAIR
4. FOR APPROACH BRIDGE SEMIS SECTIONS REFER DWG. NO.4344/SOT/BD/030010

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
13TH FLOOR NCL BUILDING, ABBASS SHAHEED ROAD
OFF SHAHRA-E-FAISAL, KARACHI

NO.	DATE	DESCRIPTION
3		
2		
1		
0	JULY,2026	ISSUED FOR BIDDING

DRAWN BY: TARIQ SHAH
DESIGNED BY: MZK
CHECKED BY:
APPROVED BY: SJ NF

PROJECT: PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
REPAIR SCHEME OF APPROACH BRIDGES

SCALE: AS SHOWN

DRAWING NO: 4344/SOT/BD/030009

REVISION: 0

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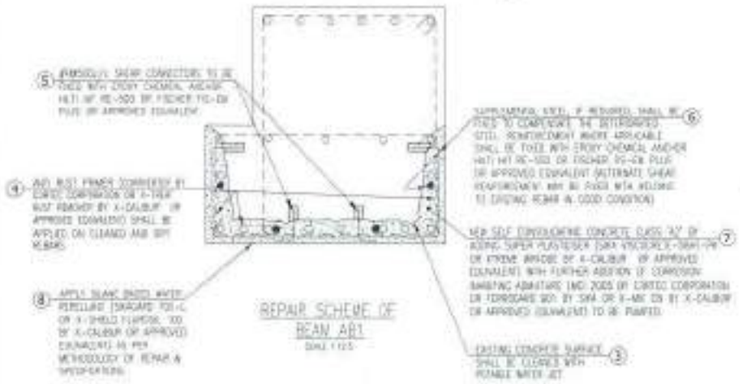
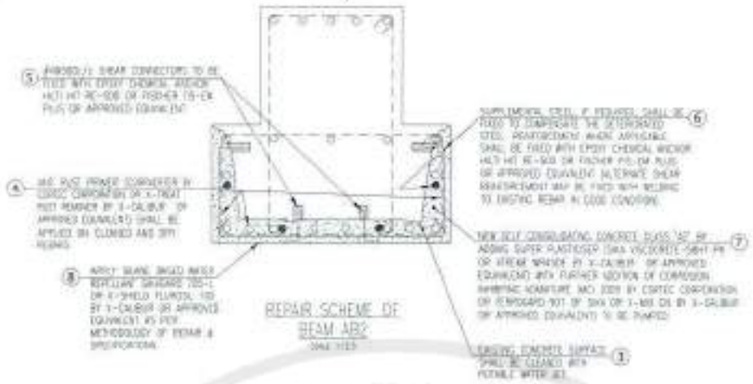
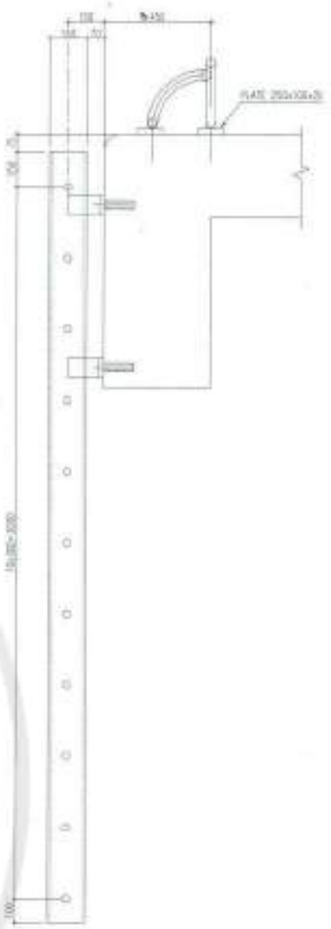
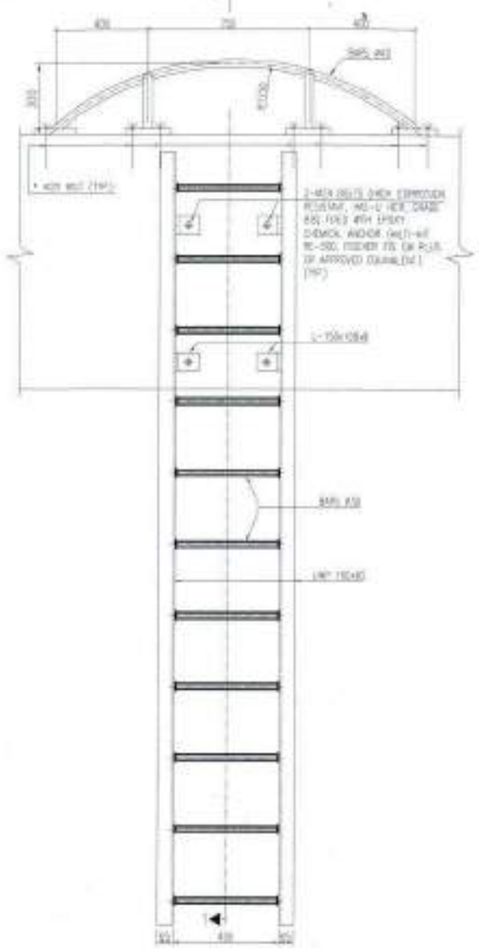
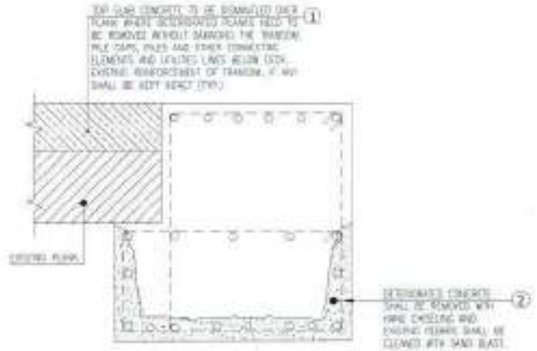




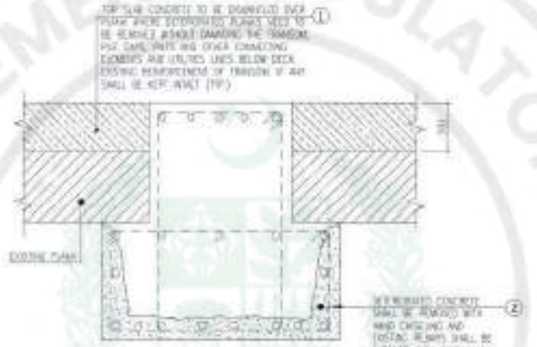




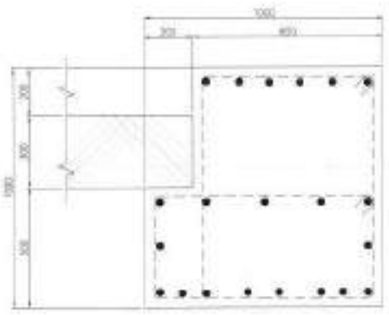
STEEL LADDER (c/c. 16.00 m)
SCALE 1:25



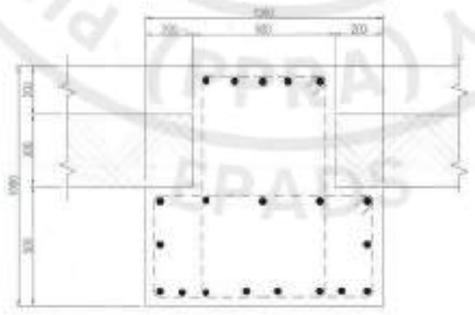
DISMANTLING SCHEME OF BEAM AB1
SCALE 1:25



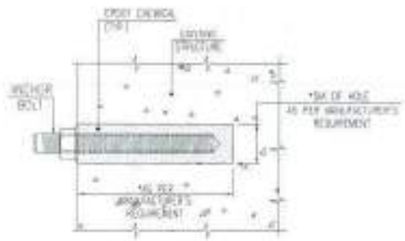
DISMANTLING SCHEME OF BEAM AB2
SCALE 1:25



EXISTING SECTION OF BEAM AB1
SCALE 1:25



EXISTING SECTION OF BEAM AB2
SCALE 1:25



TYP. DETAIL OF BOLT ANCHORAGE
SCALE 1:5

ISSUED FOR BIDDING

NOTES
1. FOR GENERAL NOTES REFER DWG. NO.4344/SOT/BD/030001
2. FOR METHODOLOGY OF REPAIR REFER DWG. NO.4344/SOT/BD/030002

KORANGI FISHERIES HARBOUR AUTHORITY
MINISTRY OF MARITIME AFFAIRS
GOVERNMENT OF PAKISTAN

NATIONAL ENGINEERING SERVICES PAKISTAN (PVT.) LTD.
13TH FLOOR NCL BUILDING, ABBASI SHAHEED ROAD, OFF SHAHRA-E-FAISAL, KARACHI

REV.	DATE	DESCRIPTION
3		
2		
1		
0	JULY,2026	ISSUED FOR BIDDING

DRAWN BY: TARIQ SHAH
DESIGNED BY: MZUL
CHECKED BY:
APPROVED BY:

PROJECT:
PACKAGE-B : ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DRAWING

TITLE: REHABILITATION OF UNLOADING JETTY AND APPROACH BRIDGES
REPAIR SCHEME OF APPROACH BRIDGES BEAMS & DETAILS OF STEEL LADDER

SCALE: AS SHOWN
REVISION: 0
DRAWING NO: 4344/SOT/BD/030010

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KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DOCUMENTS

VOLUME-V

LETTER OF FINANCIAL BID
SCHEDULE-B TO BID: BILL OF QUANTITIES
SCHEDULE-H TO BID: ESTIMATED PROGRESS PAYMENTS

July, 2026

National Engineering Services Pakistan (Pvt.) Ltd.
13th Floor, N.I.C. Building, Abbasi Shaheed Road, Off. Shahrah-e-Faisal, Karachi
Phone: (0092 21) 99207277-84
Fax: (0092 21) 35651994
E-mail: nespakkh@khi.wol.net.pk
Web: http://www.nespak.com.pk

Clearance Code	4344/50W/BD/5(26)	Doc No.	4344/BD/PII/00	Rev No.	00

National Engineering Services Pakistan (Pvt.) Ltd. NESPAK Karachi

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BIDDING DOCUMENTS
VOLUME-V

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LETTER OF FINANCIAL BID

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LETTER OF FINANCIAL BID

[on bidder's letter head]

Bid Reference No. _____ Date: _____

[Name of Contract/ Works]

To: _____

_____

Gentleman,

(a) Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Specifications, Schedules to Bid including Bill of Quantities, Drawings and Addenda Nos. _____ for the execution of the above-named Works, we, the undersigned, offer to execute and complete such Works and remedy any defects therein in conformity with the said Bidding Documents and Addenda for the sum of Equivalent PKR _____ (Eq. Pak Rupees _____ _____) or such other sum as may be ascertained in accordance with the said conditions.

(b) We meet the eligibility requirements in accordance with IB.3.

(c) We understand that all the Schedules attached hereto form part of this Bid.

(d) As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of PKR _____ (Pak. Rupees. _____) drawn in your favour or made payable to you and valid for a period of _____ days beginning from the date Bids are opened.

(e) We agree to abide by this Bid for the period ofdays, inclusive of 28 days beyond Bid validity period (as mentioned at Sr. No. (d) above) and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

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

(g) Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

(h) We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other Bidder for the Works.

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(i) We understand that you are not bound to accept the lowest or any Bid you may receive.

(j) We undertake that all the information and documents submitted with the Bid are genuine, and in case of incorrect information of fake documents we shall be liable for punitive action under the Applicable Law.

Dated this_____day of_____20_____

Signature: _____

in the capacity of_____duly authorized to sign Bids for and on behalf of

_____

(Name of Bidder in Block Capitals)
(Seal)

Address:_____

_____

_____

Witness:

Signature:_____

Name: _____

Address. _____

_____

Occupation_____

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SCHEDULE-B TO BID: BILL OF QUANTITIES

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B-1
Schedule-B to Bid

BILL OF QUANTITIES

A. Daywork Schedule

We understand and agree that for execution of any work on the basis of Daywork the written order of the Engineer is required.

The Contractor will be paid for work in respect of which he is directed by written order of the Engineer to perform as Daywork, on the basis and at the rates and prices set forth herein.

Workmen:

Workmen hours and other costs towards dayworks shall be paid in Pak Rupees only, in accordance with the following schedule:

S.NO.	Type of Workmen	(First Class)	Rate per hour (Rupees)
1.	Carpenter	"	370.00
2.	Mason	"	370.00
3.	Plumber/Fitter	"	360.00
4.	Electrician	"	400.00
5.	Mechanic	"	330.00
6.	Welder	"	330.00
7.	Painter	"	330.00
8.	Black smith/fixer	"	330.00
9.	Machine Operator	"	330.00
10.	Semi skilled	"	320.00
11.	Un skilled	"	260.00

(1) The above hourly rates include percentage addition of 45% to cover the Contractor's profit, overhead charges, superintendence and insurance; all allowances of workmen and other clerical and office work, the use, repair and sharpening of tools, the use of consumable stores and electrical power; the use of non-mechanical plant and scaffolding, the use of water, lighting and appliances of all descriptions; supervision by Contractor's staff, foremen, gangers, and all other incidental charges whatsoever.

(2) The Contractor shall carry out all Day Work, within normal working hours unless the Engineer has given written approval to the contrary. Payment of workmen employed on Day Work performed outside normal working hours will be made at overtime rate only if the Engineer has given such approval. Rate for overtime shall be the rate indicated above plus 50% increase for overtime work.

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B-2
Schedule-B to Bid

Materials:

Materials to be supplied for Daywork which are actually incorporated into the Works shall be paid for at the invoiced price for locally procured materials of local or foreign origin delivered to Site plus surcharge of 30% for cartage and handling from source to site, wastage and Contractor's overhead and profit.

Any payment made for Daywork shall be final.

Plant:

Any plant used for Daywork shall be charged at the hire rates entered by us in Appendix "G" to the Form of Tender or if not listed herein, at comparable rates.

The hire rate of construction plant and equipment entered in Appendix ‘G’ shall be applicable only for work done on the basis of Daywork provisions.

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B-3
Schedule-B to Bid

B. Preamble

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, 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 executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices entered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix as per the Contract.

3. The rates and prices entered in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the contract include all costs of Contractor's plant, labour, supervision, materials, execution, insurance, profit, taxes (exclusive of Sindh Sales Tax (SST) on Construction Services) and duties, together with all general risks, liabilities and obligations set out or implied in the contract. Furthermore, all duties, taxes and other levies payable by the Contractor under the contract, or for any other cause, as on the date 28 days prior to deadline for submission of Bids respectively, shall be included in the rates and prices and the total bid price submitted by the bidder.

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 will have failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities and shall not be paid separately.

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 the Works, or the same shall be determined by the Engineer in accordance with Clause 13, General Conditions.

6. General directions and description of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Bidding Documents 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-Clause 13.4 of General Conditions (GC) except with respect to DAAB fees and the expenses in accordance with GC Clause 21.

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B-4

Schedule-B to Bid

8. In the event that the Contractor's Bid was found to be seriously unbalanced (Front Loaded) during evaluation in relation to the average of other evaluated substantially responsive bids, the Employer during execution of the Contract shall pay against measured quantities of significantly higher quoted line item(s) rate(s) with respect to same line item(s) rate(s) determined from the average of other lowest two evaluated substantially responsive bids as instructed by the Engineer. The balance line item(s) rate(s) shall be paid against the same measured quantities at the time of issuance of Taking-Over Certificate. The list of significantly higher quoted line item(s) rate(s) is stated in the Letter of Acceptance.

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KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BILL OF QUANTITIES

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PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BILL OF QUANTITIES

SUMMARY OF COST

Code	Description	Amount (Rs.)
01	**ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES**	
	C. Civil Works	
	Povisional Sum (DAAB Fee, Transportation, Communication Charges, Addition Items etc.)	20,000,000
	Total	

The above Cost is exclusive of Sindh Sales Tax

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

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KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

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LETTER OF FINANCIAL BID
SCHEDULE-B TO BID: BILL OF QUANTITIES
SCHEDULE-H TO BID: ESTIMATED PROGRESS PAYMENTS

July, 2026

National Engineering Services Pakistan (Pvt.) Ltd.
13th Floor, N.I.C. Building, Abbasi Shaheed Road, Off. Shahrah-e-Faisal, Karachi
Phone: (0092 21) 99207277-84
Fax: (0092 21) 35651994
E-mail: nespakkh@khi.wol.net.pk
Web: http://www.nespak.com.pk

Clearance Code	4344/50W/BD/5(26)	Doc No.	4344/BD/PII/00	Rev No.	00

National Engineering Services Pakistan (Pvt.) Ltd. NESPAK Karachi

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

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LETTER OF FINANCIAL BID

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LETTER OF FINANCIAL BID

[on bidder's letter head]

Bid Reference No. _____ Date: _____

[Name of Contract/ Works]

To: _____

_____

Gentleman,

(a) Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Specifications, Schedules to Bid including Bill of Quantities, Drawings and Addenda Nos. _____ for the execution of the above-named Works, we, the undersigned, offer to execute and complete such Works and remedy any defects therein in conformity with the said Bidding Documents and Addenda for the sum of Equivalent PKR _____ (Eq. Pak Rupees _____ _____) or such other sum as may be ascertained in accordance with the said conditions.

(b) We meet the eligibility requirements in accordance with IB.3.

(c) We understand that all the Schedules attached hereto form part of this Bid.

(d) As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of PKR _____ (Pak. Rupees. _____) drawn in your favour or made payable to you and valid for a period of _____ days beginning from the date Bids are opened.

(e) We agree to abide by this Bid for the period ofdays, inclusive of 28 days beyond Bid validity period (as mentioned at Sr. No. (d) above) and it shall remain binding upon us and may be accepted at any time before the expiration of that period.

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

(g) Unless and until a formal Agreement is prepared and executed, this Bid, together with your written acceptance thereof, shall constitute a binding contract between us.

(h) We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other Bidder for the Works.

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(i) We understand that you are not bound to accept the lowest or any Bid you may receive.

(j) We undertake that all the information and documents submitted with the Bid are genuine, and in case of incorrect information of fake documents we shall be liable for punitive action under the Applicable Law.

Dated this_____day of_____20_____

Signature: _____

in the capacity of_____duly authorized to sign Bids for and on behalf of

_____

(Name of Bidder in Block Capitals)
(Seal)

Address:_____

_____

_____

Witness:

Signature:_____

Name: _____

Address. _____

_____

Occupation_____

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SCHEDULE-B TO BID: BILL OF QUANTITIES

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B-1
Schedule-B to Bid

BILL OF QUANTITIES

A. Daywork Schedule

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6.	Welder	"	330.00
7.	Painter	"	330.00
8.	Black smith/fixer	"	330.00
9.	Machine Operator	"	330.00
10.	Semi skilled	"	320.00
11.	Un skilled	"	260.00

(1) The above hourly rates include percentage addition of 45% to cover the Contractor's profit, overhead charges, superintendence and insurance; all allowances of workmen and other clerical and office work, the use, repair and sharpening of tools, the use of consumable stores and electrical power; the use of non-mechanical plant and scaffolding, the use of water, lighting and appliances of all descriptions; supervision by Contractor's staff, foremen, gangers, and all other incidental charges whatsoever.

(2) The Contractor shall carry out all Day Work, within normal working hours unless the Engineer has given written approval to the contrary. Payment of workmen employed on Day Work performed outside normal working hours will be made at overtime rate only if the Engineer has given such approval. Rate for overtime shall be the rate indicated above plus 50% increase for overtime work.

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B-2
Schedule-B to Bid

Materials:

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Any payment made for Daywork shall be final.

Plant:

Any plant used for Daywork shall be charged at the hire rates entered by us in Appendix "G" to the Form of Tender or if not listed herein, at comparable rates.

The hire rate of construction plant and equipment entered in Appendix ‘G’ shall be applicable only for work done on the basis of Daywork provisions.

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B-3
Schedule-B to Bid

B. Preamble

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, 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 executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices entered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix as per the Contract.

3. The rates and prices entered in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the contract include all costs of Contractor's plant, labour, supervision, materials, execution, insurance, profit, taxes (exclusive of Sindh Sales Tax (SST) on Construction Services) and duties, together with all general risks, liabilities and obligations set out or implied in the contract. Furthermore, all duties, taxes and other levies payable by the Contractor under the contract, or for any other cause, as on the date 28 days prior to deadline for submission of Bids respectively, shall be included in the rates and prices and the total bid price submitted by the bidder.

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 will have failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities and shall not be paid separately.

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 the Works, or the same shall be determined by the Engineer in accordance with Clause 13, General Conditions.

6. General directions and description of work and materials are not necessarily repeated nor summarized in the Bill of Quantities. References to the relevant sections of the Bidding Documents 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-Clause 13.4 of General Conditions (GC) except with respect to DAAB fees and the expenses in accordance with GC Clause 21.

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B-4

Schedule-B to Bid

8. In the event that the Contractor's Bid was found to be seriously unbalanced (Front Loaded) during evaluation in relation to the average of other evaluated substantially responsive bids, the Employer during execution of the Contract shall pay against measured quantities of significantly higher quoted line item(s) rate(s) with respect to same line item(s) rate(s) determined from the average of other lowest two evaluated substantially responsive bids as instructed by the Engineer. The balance line item(s) rate(s) shall be paid against the same measured quantities at the time of issuance of Taking-Over Certificate. The list of significantly higher quoted line item(s) rate(s) is stated in the Letter of Acceptance.

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KORANGI FISHERIES HARBOUR AUTHORITY

PACKAGE-II: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

BILL OF QUANTITIES

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	C. Civil Works	01C-1 to 01C-14

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

BILL OF QUANTITIES

CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	C. CIVIL WORKS				
	UNLOADING JETTY				
	DEMOLISHING & DISMANTLING/ REMOVING Ref. Spec. No. 0200				
	Methodology for Repair Works: Details given in the drawings for damaged, deteriorated and repair works are schematic. A complete methodology, preparation of shop drawings showing deteriorated concrete surfaces, quantity and the sequence of work including dismantling, removal of deteriorated concrete, cleaning of existing rusted steel components and application of repair works as given in the repair scheme below & as given in drawings, formwork and shoring/ supporting system for existing structure, retain and provide support for existing utilities and poles etc; shall be submitted by the Contractor for Engineer's review and approval. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.				
	Surface Preparation				
	A- Beam/ Top, Sides & Bottom				
01-1C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated **existing reinforced cement concrete works** at any depth & level after **installation of temporary support for existing structural member**, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	1,075		

Unit Rate in words ……

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	B- Planks/ Slab/ Deck				
01-2C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated **existing reinforced cement concrete works** at any depth & level, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	50		
	Unit Rate in words ……				
	C-Cleaning of Concrete with High Pressure Clean Water				
01-3C	Surface preparation of concrete for repairs including cleaning of concrete surfaces and flushing with high pressure clean water (minimum 200bar) with portable equipment, using potable water to remove all dirt, laitance, loose particles & contaminants etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	7,915		
	Unit Rate in words ……				
01-4C	Sand blasting and cleaning of existing corroded steel bars etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	7,915		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
01-5C	Removal of Jetty fixtures & other items including **existing MS ladders** at any depth and level, stacking of useable materials which shall be handed over to the Employer and disposal of debris/ unused/ demolished/ removed materials including loading, unloading and transporting etc. complete in all respects to designated places and up to any lead or areas inside the harbour limits at specified location or as directed by the Engineer and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during dismantling/ removal works.	No	10		
	Unit Rate in words ……				
	REINFORCEMENT Ref. Spec. No. 2200				
01-6C	Providing, furnishing, cutting, bending, binding, welding, placing of reinforcing bars, anchors or inserts (ASTM A-706, Grade 60 deformed hot rolled billet steel bars), complete in all respects as specified and directed by the Engineer including all labor, material, equipment, tools or any incidental items required to complete the work satisfactorily.	tonne	110		
	Unit Rate in words ……				
01-7C	Anchorage with epoxy chemical anchor Hilti-HIT RE-500 / Fischer FIS-EM Plus or approved equivalent including drilling of holes in existing structures, fixing and fixing accessories etc., complete in all respects as shown on the drawings and specifications. (excluding the cost of steel rebar).	Litre	500		
	Unit Rate in words ……				
01-8C	Supply and application of anti-corrosion primer CorrVerter / X-Treat RustRemover by X-Calibur or approved equivalent to cleaned and prepared reinforcement bars, in accordance with the manufacturer's recommendations etc.; complete in all respects as shown in drawings and specifications and as directed by the Engineer.	Litre	805		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)

PLAIN AND REINFORCED CONCRETE

Ref. Spec. No. 2100, 2300, 2330

Repair of deteriorated Beams

01-9C Repair with Class 'A2' (40 MPa) SCC (Self-Consolidating Reinforced Cement Concrete with reduced-size aggregate as per General Notes and Drawings), using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications; to be pumped in a water tight formwork, etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.

Cum 1,075

Unit Rate in words .....

Repair of deteriorated Slab/ Plank/ Deck

01-10C Patch Repairs of deteriorated Slab/ Plank/ Deck with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing furnishing all materials, labour, equipment, tools and any identical work.

Cum 50

Unit Rate in words .....

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Repair of deteriorated Pile Head/ Concrete Surfaces				
01-11C	Patch Repairs of deteriorated Pile Head/ Concrete Surfaces with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Cum	25		
	Unit Rate in words ……				
	Crack Repair				
	A- Preparation for Injection				
01-12C	Preparing for injection of Resin to cracks in concrete surfaces of structures including drilled packers, plugging and re-working after injection e.g. filling of holes with repair mortar and finish etc. complete in all respects.	Rm	Rate only		-
	Unit Rate in words ……				
	B- Supply and Injection of SikaInject 232				
01-13C	Supply, mixing and injection of resin SikaInject 232 or approved equivalent product including all associated works as describe in previous item etc. complete in all respects.	Litre	Rate only		-
	Unit Rate in words ……				
01-14C	Sealing of concrete surfaces by providing, furnishing and application of silane-based water repellent coating (Sikagard-705 L / X-Shield FluroSil 100 by X-Calibur or approved equivalent) on the specified areas as per manufacturer's specifications and all as directed and approved by the Engineer including surface preparation, performance tests and all materials, labor, equipment, tools etc. necessary to complete the work satisfactorily.	Sqm	7,915		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	MISCLLENIOUS STEEL WORKS Ref. Spec. No. 3100				
01-15C	Supply, fabrication and installation of galvanized steel ladder, including anchor bolts, embedding, embedded parts, fixing and all fixing accessories etc., complete in all respects as per original (existing) design drawings available with the Employer or as shown on the drawings and as per specifications.	Kg	3,500		
	Unit Rate in words ……				

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

BILL OF QUANTITIES

CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)

APPROACH BRIDGE 1 & 2

DEMOLISHING & DISMANTLING/ REMOVING

Ref. Spec. No. 0200

Methodology for Repair Works

Details given in the drawings for damaged, deteriorated and repair works are schematic. A complete repair methodology, Shop Drawings showing deteriorated concrete surfaces, quantities and sequence of work shall be submitted by the Contractor for the Engineer's review and approval.

Repair works shall be executed on Approach Bridge 1 and 2 separately, ensuring that only one bridge remains under repair at any time and the other one remains operational.

The existing deck wearing surface, service channel, expansion joints, handrails, and associated components shall be carefully dismantled without damaging the top slab, precast planks, transoms/beams, reinforcement, pile caps, piles, or existing utility services. Damaged/ deteriorated precast planks shall be identified, marked on drawings, and submitted to the Engineer for approval. Approved planks, together with the overlying top slab, shall be isolated using a concrete saw cutter and removed carefully without affecting adjacent structural members or utilities. Temporary supports shall be provided for utilities, poles, and other elements requiring protection during the works.

Pile heads and transoms shall be repaired in accordance with the approved unloading jetty beam repair methodology. New precast planks shall then be cast, cured, and installed over the repaired transoms. Upon completion, the existing handrails, expansion joints, and associated components shall be reinstated in accordance with the original drawings and verified site conditions. Shop drawings and installation details shall be submitted to the Engineer for review and approval before execution.

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Surface Preparation				
	A- Beam/ Transom - Top, Sides & Bottom				
01-16C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated **existing reinforced cement concrete works** at any depth & level, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	42		
	Unit Rate in words				
	B- Removal of Deck (Planks and Slab)				
01-17C	Dismantling/removal of existing damaged/ deteriorated planks including overlaid top slab and other associated elements shall be carried out using saw cutter and in accordance with the approved methodology and with due care to prevent any damage to adjacent structural members, including existing planks, slabs, transom/ beam, pile cap, piles & their reinforcement, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure, services and temporary works during removing, cleaning and repair work.	Cum	287		
	Unit Rate in words				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	C-Cleaning of Concrete with High Pressure Clean Water				
01-18C	Surface preparation of concrete for repairs including cleaning of concrete surfaces and flushing with high pressure clean water (minimum 200bar) with portable equipment, using potable water to remove all dirt, laitance, loose particles & contaminants etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	370		
	Unit Rate in words ……				
	Removal and reinstallation of existing hand rails				
01-19C	Careful dismantling, safe removal, and reinstallation of **existing hand rails** including all associated structural components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including bolts, plates, members, anchors, fittings, etc.) as required; surface preparation and application of painting or protective coating to the railing, wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, specifications, and as directed by the Engineer. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Rm	204		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Removal and Reinstallation of Existing Expansion Joint				
01-20C	Careful dismantling, safe removal, and reinstallation of **existing expansion joints** including all associated components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including neoprene, plates, members, anchors, fittings, etc.) as required or wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, specifications, and as directed by the Engineer. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Rm	42		
	Unit Rate in words ……				
01-21C	Sand blasting and cleaning of existing corroded steel rebars etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	370		
	Unit Rate in words ……				
	REINFORCEMENT Ref. Spec. No. 2200				
01-22C	Providing, furnishing, cutting, bending, binding, welding, placing of reinforcing bars, anchors or inserts (ASTM A-706, Grade 60 deformed hot rolled billet steel bars), complete in all respects as specified and directed by the Engineer including all labor, material, equipment, tools or any incidental items required to complete the work satisfactorily.	tonne	45		
	Unit Rate in words ……				
01-23C	Anchorage with epoxy chemical anchor Hilti-HIT RE-500 / Fischer FIS-EM Plus or approved equivalent including drilling of holes in existing structures, fixing and fixing accessories etc., complete in all respects as shown on the drawings and specifications. (excluding the cost of steel rebar).	Litre	120		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
01-24C	Supply and application of anti-corrosion primer CorrVerter / X-Treat RustRemover by X-Calibur or approved equivalent to cleaned and prepared reinforcement bars, in accordance with the manufacturer's recommendations etc.; complete in all respects as shown in drawings and specifications and as directed by the Engineer.	Litre	72		
	Unit Rate in words				
	PLAIN AND REINFORCED CONCRETE Ref. Spec. No. 2100, 2300, 2330				
	Repair of deteriorated Transom/ Beam				
01-25C	Repair with Class 'A2' (40 MPa) SCC (Self-Consolidating Reinforced Cement Concrete with reduced-size aggregate as per General Notes and drawings), using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications; to be pumped in a water tight formwork, etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	42		
	Unit Rate in words				
	Precast Planks				
01-26C	Precast Class 'A2' (40 MPa) Reinforced Cement Concrete, using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	180		
	Unit Rate in words				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Launching of Planks				
01-27C	Launching of planks etc.; by approved means over land, water, including all temporary works, etc., complete in all respects as per drawings and specifications.	tonne	433		
	Unit Rate in words ……				
	Slab				
01-28C	Class 'A2' (40 MPa) Reinforced Cement Concrete, using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	120		
	Unit Rate in words ……				
01-29C	Supply and application of bonding agent SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent shall be applied on the old concrete surfaces and exposed steel reinforcement before application of top slab, in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Sqm	72		
	Unit Rate in words ……				

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National Engineering Services Pakistan (Pvt) Ltd. NESPAK Karachi

CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Patch Repair of deteriorated Plank/ Slab/ Pile Head/ Transom / Concrete Surfaces				
01-30C	Patch Repairs of deteriorated Pile Head/ Transom/ Concrete Surfaces with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Cum	5		
	Unit Rate in words				
01-31C	Sealing of concrete surfaces by providing, furnishing and application of silane-based water repellent coating (Sikagard-705 L / X-Shield FluroSil 100 by X-Calibur or approved equivalent) on the specified areas as per manufacturer's specifications and all as directed and approved by the Engineer including surface preparation, performance tests and all materials, labor, equipment, tools etc. necessary to complete the work satisfactorily.	Sqm	300		
	Unit Rate in words				
	EXPANSION JOINT Ref. Spec. No. 2315				
01-32C	Supply and installation of Floor Expansion Joint including embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as shown on the drawings and as per specifications.	Rm	Rate only		-
	Unit Rate in words				

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BILL OF QUANTITIES

CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	MISCLLENIOUS STEEL WORKS Ref. Spec. No. 3100				
01-33C	Supply, fabrication and installation of epoxy painted MS hand rails including embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as shown on the drawings and as per specifications. (excluding the cost of anchor bolts and epoxy chemical).	Kg	Rate only		-
	Unit Rate in words ……				
01-34C	Providing and installation of anchor bolts (High Corrosion Resistant, HAS-U HCR, Grade 8.8) of the following diameters etc, complete in all respects as shown on the drawings and as per specifications.				
	a) 10mm	No	Rate only		-
	Unit Rate in words ……				
	b) 12mm	No	Rate only		-
	Unit Rate in words ……				
	c) 16mm	No	Rate only		-
	Unit Rate in words ……				
	d) 20mm	No	Rate only		-
	Unit Rate in words ……				
	e) 24mm	No	Rate only		-
	Unit Rate in words ……				
	f) 28mm	No	Rate only		-
	Unit Rate in words ……				
	Total Cost of Code No. 01: Civil Works Carried over to Summary of Cost				

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SCHEDULE-H TO BID:
ESTIMATED PROGRESS PAYMENTS

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H-1
Schedule-H to Bid

ESTIMATED PROGRESS PAYMENTS

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

Month/Quarter/ Year	Amounts (in thousands)
1st Month	
2nd Month	
3rd Month	
4th Month	
5th Month	
6th Month	
7th Month	
8th Month	
9th Month	
10th Month	
11th Month	
12th Month	
Bid Price	

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	C. CIVIL WORKS				
	UNLOADING JETTY				
	DEMOLISHING & DISMANTLING/ REMOVING Ref. Spec. No. 0200				
	Methodology for Repair Works: Details given in the drawings for damaged, deteriorated and repair works are schematic. A complete methodology, preparation of shop drawings showing deteriorated concrete surfaces, quantity and the sequence of work including dismantling, removal of deteriorated concrete, cleaning of existing rusted steel components and application of repair works as given in the repair scheme below & as given in drawings, formwork and shoring/ supporting system for existing structure, retain and provide support for existing utilities and poles etc; shall be submitted by the Contractor for Engineer's review and approval. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.				
	Surface Preparation				
	A- Beam/ Top, Sides & Bottom				
01-1C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated **existing reinforced cement concrete works** at any depth & level after **installation of temporary support for existing structural member**, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	1,075		

Unit Rate in words ……

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	B- Planks/ Slab/ Deck				
01-2C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated **existing reinforced cement concrete works** at any depth & level, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	50		
	Unit Rate in words ……				
	C-Cleaning of Concrete with High Pressure Clean Water				
01-3C	Surface preparation of concrete for repairs including cleaning of concrete surfaces and flushing with high pressure clean water (minimum 200bar) with portable equipment, using potable water to remove all dirt, laitance, loose particles & contaminants etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	7,915		
	Unit Rate in words ……				
01-4C	Sand blasting and cleaning of existing corroded steel bars etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	7,915		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
01-5C	Removal of Jetty fixtures & other items including **existing MS ladders** at any depth and level, stacking of useable materials which shall be handed over to the Employer and disposal of debris/ unused/ demolished/ removed materials including loading, unloading and transporting etc. complete in all respects to designated places and up to any lead or areas inside the harbour limits at specified location or as directed by the Engineer and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during dismantling/ removal works.	No	10		
	Unit Rate in words ……				
	REINFORCEMENT Ref. Spec. No. 2200				
01-6C	Providing, furnishing, cutting, bending, binding, welding, placing of reinforcing bars, anchors or inserts (ASTM A-706, Grade 60 deformed hot rolled billet steel bars), complete in all respects as specified and directed by the Engineer including all labor, material, equipment, tools or any incidental items required to complete the work satisfactorily.	tonne	110		
	Unit Rate in words ……				
01-7C	Anchorage with epoxy chemical anchor Hilti-HIT RE-500 / Fischer FIS-EM Plus or approved equivalent including drilling of holes in existing structures, fixing and fixing accessories etc., complete in all respects as shown on the drawings and specifications. (excluding the cost of steel rebar).	Litre	500		
	Unit Rate in words ……				
01-8C	Supply and application of anti-corrosion primer CorrVerter / X-Treat RustRemover by X-Calibur or approved equivalent to cleaned and prepared reinforcement bars, in accordance with the manufacturer's recommendations etc.; complete in all respects as shown in drawings and specifications and as directed by the Engineer.	Litre	805		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)

PLAIN AND REINFORCED CONCRETE

Ref. Spec. No. 2100, 2300, 2330

Repair of deteriorated Beams

01-9C Repair with Class 'A2' (40 MPa) SCC (Self-Consolidating Reinforced Cement Concrete with reduced-size aggregate as per General Notes and Drawings), using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications; to be pumped in a water tight formwork, etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.

Cum 1,075

Unit Rate in words ……

Repair of deteriorated Slab/ Plank/ Deck

01-10C Patch Repairs of deteriorated Slab/ Plank/ Deck with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing furnishing all materials, labour, equipment, tools and any identical work.

Cum 50

Unit Rate in words ……

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Repair of deteriorated Pile Head/ Concrete Surfaces				
01-11C	Patch Repairs of deteriorated Pile Head/ Concrete Surfaces with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Cum	25		
	Unit Rate in words ……				
	Crack Repair				
	A- Preparation for Injection				
01-12C	Preparing for injection of Resin to cracks in concrete surfaces of structures including drilled packers, plugging and re-working after injection e.g. filling of holes with repair mortar and finish etc. complete in all respects.	Rm	Rate only		-
	Unit Rate in words ……				
	B- Supply and Injection of SikaInject 232				
01-13C	Supply, mixing and injection of resin SikaInject 232 or approved equivalent product including all associated works as describe in previous item etc. complete in all respects.	Litre	Rate only		-
	Unit Rate in words ……				
01-14C	Sealing of concrete surfaces by providing, furnishing and application of silane-based water repellent coating (Sikagard-705 L / X-Shield FluroSil 100 by X-Calibur or approved equivalent) on the specified areas as per manufacturer's specifications and all as directed and approved by the Engineer including surface preparation, performance tests and all materials, labor, equipment, tools etc. necessary to complete the work satisfactorily.	Sqm	7,915		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	MISCLLENIOUS STEEL WORKS Ref. Spec. No. 3100				
01-15C	Supply, fabrication and installation of galvanized steel ladder, including anchor bolts, embedding, embedded parts, fixing and all fixing accessories etc., complete in all respects as per original (existing) design drawings available with the Employer or as shown on the drawings and as per specifications.	Kg	3,500		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)

APPROACH BRIDGE 1 & 2

DEMOLISHING & DISMANTLING/ REMOVING

Ref. Spec. No. 0200

Methodology for Repair Works

Details given in the drawings for damaged, deteriorated and repair works are schematic. A complete repair methodology, Shop Drawings showing deteriorated concrete surfaces, quantities and sequence of work shall be submitted by the Contractor for the Engineer's review and approval.

Repair works shall be executed on Approach Bridge 1 and 2 separately, ensuring that only one bridge remains under repair at any time and the other one remains operational.

The existing deck wearing surface, service channel, expansion joints, handrails, and associated components shall be carefully dismantled without damaging the top slab, precast planks, transoms/beams, reinforcement, pile caps, piles, or existing utility services. Damaged/ deteriorated precast planks shall be identified, marked on drawings, and submitted to the Engineer for approval. Approved planks, together with the overlying top slab, shall be isolated using a concrete saw cutter and removed carefully without affecting adjacent structural members or utilities. Temporary supports shall be provided for utilities, poles, and other elements requiring protection during the works.

Pile heads and transoms shall be repaired in accordance with the approved unloading jetty beam repair methodology. New precast planks shall then be cast, cured, and installed over the repaired transoms. Upon completion, the existing handrails, expansion joints, and associated components shall be reinstated in accordance with the original drawings and verified site conditions. Shop drawings and installation details shall be submitted to the Engineer for review and approval before execution.

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Surface Preparation				
	A- Beam/ Transom - Top, Sides & Bottom				
01-16C	Surface preparation of concrete for repairs including cutting/ chiseling of deteriorated **existing reinforced cement concrete works** at any depth & level, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Cum	42		
	Unit Rate in words				
	B- Removal of Deck (Planks and Slab)				
01-17C	Dismantling/removal of existing damaged/ deteriorated planks including overlaid top slab and other associated elements shall be carried out using saw cutter and in accordance with the approved methodology and with due care to prevent any damage to adjacent structural members, including existing planks, slabs, transom/ beam, pile cap, piles & their reinforcement, stacking of useable material which shall be handed over to the Employer and furnishing & providing all materials, tools, equipment, labour and disposal of damaged, deteriorated or contaminated, debris/ unused/ demolished/ removed materials including loading, unloading and transporting to designated places and up to any lead or areas inside the harbour limits at specified location etc. complete in all respects as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure, services and temporary works during removing, cleaning and repair work.	Cum	287		
	Unit Rate in words				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	C-Cleaning of Concrete with High Pressure Clean Water				
01-18C	Surface preparation of concrete for repairs including cleaning of concrete surfaces and flushing with high pressure clean water (minimum 200bar) with portable equipment, using potable water to remove all dirt, laitance, loose particles & contaminants etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	370		
	Unit Rate in words ……				
	Removal and reinstallation of existing hand rails				
01-19C	Careful dismantling, safe removal, and reinstallation of **existing hand rails** including all associated structural components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including bolts, plates, members, anchors, fittings, etc.) as required; surface preparation and application of painting or protective coating to the railing, wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, specifications, and as directed by the Engineer. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Rm	204		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Removal and Reinstallation of Existing Expansion Joint				
01-20C	Careful dismantling, safe removal, and reinstallation of **existing expansion joints** including all associated components, at any elevation; stacking and proper safeguarding of all serviceable materials for reinstatement after completion of works; repair and/or replacement of damaged or corroded components (including neoprene, plates, members, anchors, fittings, etc.) as required or wherever directed or required to restore it to its original condition; handing over of unserviceable/salvage materials to the Employer; including all loading, unloading, handling, and transportation to designated locations, etc. complete in all respects as per drawings, specifications, and as directed by the Engineer. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Rm	42		
	Unit Rate in words ……				
01-21C	Sand blasting and cleaning of existing corroded steel rebars etc.; complete in all respects or as directed by the Engineer and as shown in the drawings and specification. Contractor is fully responsible for the safety and stability of existing structure and temporary works during removing, cleaning and repair works.	Sqm	370		
	Unit Rate in words ……				
	REINFORCEMENT Ref. Spec. No. 2200				
01-22C	Providing, furnishing, cutting, bending, binding, welding, placing of reinforcing bars, anchors or inserts (ASTM A-706, Grade 60 deformed hot rolled billet steel bars), complete in all respects as specified and directed by the Engineer including all labor, material, equipment, tools or any incidental items required to complete the work satisfactorily.	tonne	45		
	Unit Rate in words ……				
01-23C	Anchorage with epoxy chemical anchor Hilti-HIT RE-500 / Fischer FIS-EM Plus or approved equivalent including drilling of holes in existing structures, fixing and fixing accessories etc., complete in all respects as shown on the drawings and specifications. (excluding the cost of steel rebar).	Litre	120		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
01-24C	Supply and application of anti-corrosion primer CorrVerter / X-Treat RustRemover by X-Calibur or approved equivalent to cleaned and prepared reinforcement bars, in accordance with the manufacturer's recommendations etc.; complete in all respects as shown in drawings and specifications and as directed by the Engineer.	Litre	72		
	Unit Rate in words				
	PLAIN AND REINFORCED CONCRETE Ref. Spec. No. 2100, 2300, 2330				
	Repair of deteriorated Transom/ Beam				
01-25C	Repair with Class 'A2' (40 MPa) SCC (Self-Consolidating Reinforced Cement Concrete with reduced-size aggregate as per General Notes and drawings), using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications; to be pumped in a water tight formwork, etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	42		
	Unit Rate in words				
	Precast Planks				
01-26C	Precast Class 'A2' (40 MPa) Reinforced Cement Concrete, using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	180		
	Unit Rate in words				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Launching of Planks				
01-27C	Launching of planks etc.; by approved means over land, water, including all temporary works, etc., complete in all respects as per drawings and specifications.	tonne	433		
	Unit Rate in words ……				
	Slab				
01-28C	Class 'A2' (40 MPa) Reinforced Cement Concrete, using specified cement, including PCE-based third-generation superplasticizer (SIKA ViscoCrete-58HT-PK / Xtreme WR40DE by X-Calibur or approved equivalent), and silica fume & fly ash as supplementary cementitious materials in the approved proportions, with further addition of corrosion-inhibiting admixture (MCI-2005 by Cortec Corporation or FerroGard-901 by SIKA or X-Mix CN by X-Calibur or approved equivalent) mixed in concrete as per manufacturer's specifications etc.; complete in all respects as shown on the drawings and specifications and as directed by the Engineer.	Cum	120		
	Unit Rate in words ……				
01-29C	Supply and application of bonding agent SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent shall be applied on the old concrete surfaces and exposed steel reinforcement before application of top slab, in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Sqm	72		
	Unit Rate in words ……				

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CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	Patch Repair of deteriorated Plank/ Slab/ Pile Head/ Transom / Concrete Surfaces				
01-30C	Patch Repairs of deteriorated Pile Head/ Transom/ Concrete Surfaces with cementitious shrinkage compensated structural repair mortar (SIKA EMACO S488 / X-Roc UltraPatch by X-Calibur or approved equivalent). Before application of repair mortar, a bonding agent (SIKATOP Armatec 110 Epocem / X-Roc CemEpoxy by X-Calibur or approved equivalent) shall be applied to the prepared concrete surface and exposed steel reinforcement, and also between successive layers of repair mortar in accordance with specifications and manufacturer's instructions and recommendations, complete in all respects as shown in drawings and as directed by the Engineer including finishing, curing, protection against tidal splash, furnishing all materials, labour, equipment, tools and any identical work.	Cum	5		
	Unit Rate in words				
01-31C	Sealing of concrete surfaces by providing, furnishing and application of silane-based water repellent coating (Sikagard-705 L / X-Shield FluroSil 100 by X-Calibur or approved equivalent) on the specified areas as per manufacturer's specifications and all as directed and approved by the Engineer including surface preparation, performance tests and all materials, labor, equipment, tools etc. necessary to complete the work satisfactorily.	Sqm	300		
	Unit Rate in words				
	EXPANSION JOINT Ref. Spec. No. 2315				
01-32C	Supply and installation of Floor Expansion Joint including embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as shown on the drawings and as per specifications.	Rm	Rate only		-
	Unit Rate in words				

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BILL OF QUANTITIES

CODE # 01: ESTABLISHMENT & UPGRADATION OF JETTY AND RELATED STRUCTURES

Item No.	Description	Unit	Quantity	Rate (Rs.)	Amount (Rs.)
	MISCLLENIOUS STEEL WORKS Ref. Spec. No. 3100				
01-33C	Supply, fabrication and installation of epoxy painted MS hand rails including embedding, embedded parts, fixing and all fixing accessories etc, complete in all respects as shown on the drawings and as per specifications. (excluding the cost of anchor bolts and epoxy chemical).	Kg	Rate only		-
	Unit Rate in words ……				
01-34C	Providing and installation of anchor bolts (High Corrosion Resistant, HAS-U HCR, Grade 8.8) of the following diameters etc, complete in all respects as shown on the drawings and as per specifications.				
	a) 10mm	No	Rate only		-
	Unit Rate in words ……				
	b) 12mm	No	Rate only		-
	Unit Rate in words ……				
	c) 16mm	No	Rate only		-
	Unit Rate in words ……				
	d) 20mm	No	Rate only		-
	Unit Rate in words ……				
	e) 24mm	No	Rate only		-
	Unit Rate in words ……				
	f) 28mm	No	Rate only		-
	Unit Rate in words ……				
	Total Cost of Code No. 01: Civil Works Carried over to Summary of Cost				

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SCHEDULE-H TO BID:
ESTIMATED PROGRESS PAYMENTS

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H-1
Schedule-H to Bid

ESTIMATED PROGRESS PAYMENTS

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

Month/Quarter/ Year	Amounts (in thousands)
1st Month	
2nd Month	
3rd Month	
4th Month	
5th Month	
6th Month	
7th Month	
8th Month	
9th Month	
10th Month	
11th Month	
12th Month	
Bid Price	

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TESTING REPORT

CIVIL TESTING SERVICES AT KORANGI FISHERIES HARBOR AUTHORITY (KoFHA)

NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) (NESPAK)

Velosi Report No.: VISP-25-851-NDT-99

Rev	Description	Date	Prepared By	Reviewed By	Approved For Issuance By
D	Final Report	15TH JUL 2026	Meer Muhammad	Muhammad Rehan Ullah Khan	Muhammad Idress
C	Draft Report-3	26TH DEC 2025	Meer Muhammad	Muhammad Rehan Ullah Khan	Muhammad Idress
B	Draft Report-2	9TH DEC 2025	Meer Muhammad	Muhammad Rehan Ullah Khan	Muhammad Idress

VELOSI
Engineering For A Safer World

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Date of first issue: 18-11-2025	**Project No:** VISP-851-0725
Approved for Issuance by:	**Organizational unit:**
Muhammad Idress Operation Manager	R642+6RQ, Korangi harbor Chashma Goth
Client:	**Client Ref.:**
NATIONAL ENGINEERING SERVICES PAKISTAN (Pvt.) (NESPAK)	Mr. Muhammad Yasir Ujjan

PREAMBLE:

This report contains the results of Non-Destructive & Destructive Tests conducted on Korangi Fisheries Harbor Authority (KoFHA) intends to know condition of the asset and its improvement

Report No:	**Subject Group:**
VISP-25-851-NDT-99	--

Report Title:

CIVIL TESTING SERVICES AT KORANGI FISHERIES HARBOR AUTHORITY (KoFHA)

Work carried out by:

Usman Siddque, Meer Muhammad, Shehzad Ramzan and Ahrar-Uddin.

Work verified by:

Rehan Ullah khan

Date	Revision No:	Number of pages:
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Indexing terms

Non-Destructive & Destructive Testing

Keywords	**Service Area**
Core Cutting, Chloride in cement, Chemical Composition of Concrete, Carbonation Depth Test on extracted cores, Delamination Survey.	Unloading jetty and access bridges 1 and 2
	Market Sector
	Structural Consultant

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EXECUTIVE SUMMARY

Korangi Fisheries Harbor Authority (KoFHA) intends to improve infrastructure and allied services of Korangi Fish Harbour (KoFHA), especially seafood, handling and processing as per international standards.

Velosi Integrity & Safety Pakistan conducted a condition assessment of the Unloading Jetty and Access Bridges No. 1 and 2 at Korangi Fisheries Harbor for NESPAK and KoFHA. The work included concrete core extraction and strength testing, chloride content determination, chemical composition analysis, carbonation depth testing, and a delamination survey. These tests were performed to evaluate the structural integrity, durability, and extent of deterioration in the reinforced concrete elements. The findings provide essential data for planning required repairs, rehabilitation, and future upgrades of the jetty and associated structures.

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1 INTRODUCTION

KoFHA is located approximately 22 km east of the Karachi city center. It is a purpose-built facility designed to handle deep sea fishing vessels. Situated in the Korangi Creek, the KoFHA is at a distance of around 15 km from the mouth of the Korangi Creek at the Arabian Sea. The construction work of KoFHA was completed in 1998.

The existing jetty is 709 meter long comprised of three portions, 51m x 203.5 m Unloading Jetty, 19m x 212m Supply Jetty and 8m x 293.5m Waiting Jetty. There are four approach bridges to access the jetty from land side. Two access bridges are of size 8m x 81m and the two other bridges are of size 8m x 49m.

2 SCOPE OF WORK

The scope of works includes conducting condition survey and field & laboratory testing of existing pre-stressed/reinforced concrete structures of Unloading Jetty and Access Bridges No.1 and No.2 at KoFH Jetty. The tests include the following:

2.1. Core Extraction and Compressive Strength Test
2.2. Determination of Water-Soluble Chloride in Concrete by Drill Dust Method
2.3. Chemical Composition of Concrete
2.4. Carbonation Depth Test on extracted cores
2.5. Delamination Survey of structural elements of Jetty and Access Bridges

2.1 CORE EXTRACTION AND COMPRESSIVE STRENGTH TEST

This test method was performed according to ASTM C42 and ASTM C39 to obtain and test core specimens to determine the compressive strength of concrete. Generally, test specimens are obtained when doubt exists about the in-place concrete quality due either to low strength test results during construction or signs of distress in the structure. Another use of this method is to provide strength information on older structures.

With reference to ASTM C42, Concrete strength is affected by the location of the concrete in a structural element, with the concrete at the bottom tending to be stronger than the concrete at the top. Core strength is also affected by core orientation relative to the horizontal plane of the concrete as placed, with strength tending to be lower when measured parallel to the horizontal plane. These factors were considered in planning the locations for obtaining concrete samples and in comparing strength test results. The other

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factor that can affect the strength of concrete measured by tests of cores is the amount and distribution of moisture in the specimen at the time of test.

The measured compressive strength of a core is generally less than that of a corresponding properly moulded and cured standard cylinder tested at the same age. According to ACI 318, the concrete represented by the cores is considered structurally adequate if the average strength of three cores is at least 85 % of the specified strength and no single core strength is less than 75 % of the specified strength.

The results of Compressive Strength through concrete core cutting are attached in **Annexure-1.**

Concrete cores are extracted and tested as per following frequency:

Table 1: Core Extraction and Compressive Strength Test

S. No	Location	Component	No. of specimen
1.	Unloading Jetty	Pile Heads	Six (06)
		Transom	Nine (09)
		Planks / Deck	Six (06)
2.	Access Bridge 1	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	Two (02)
3.	Access Bridge 2	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	Two (02)

2.2 DETERMINATION OF WATER-SOLUBLE CHLORIDE IN CONCRETE BY DRILL DUST METHOD

Chloride content in hardened concrete is commonly measured using ASTM C1152, which provides the acid-soluble chloride content as a percentage by weight of concrete. To express the chloride content by weight of cement, the measured chloride percentage is adjusted using the concrete's cement content. This is done by dividing the total chloride mass in the concrete sample by the mass of cement used in that concrete, and then converting it into a percentage.

This value is important for evaluating the risk of reinforcement corrosion, as limits in ACI 318 and other standards are generally specified as a percentage of chloride by weight of cement for different exposure categories and structural conditions. As per ACI-318-19 the limit for chloride content in hardened concrete is 1.0% by weight of concrete for category C0 i.e., dry in service and does not expose to any chemicals (Refer to table-2).

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Detailed results are attached in **Annexure-2**.

Table 2: ACI 318-19 Building Code Requirement for Chloride content

Exposure Class	Description	Maximum Water-Soluble Chloride ion (Cl-ion) Content in Concrete, Percent by Mass of Cementitious Material	
		Non-prestressed	Prestressed
C-0	Dry in service	1.00	0.06
C-1	Exposed to moisture, no external chlorides	0.30	0.06
C-2	Exposed to moisture and external chlorides	0.15	0.06

Drill Dust method was used to collect sample from site and tested in the laboratory as per mentioned code. Frequency of the samples are provided in the below table:

Table 3: Drill Dust Samples

S. No	Location	Component	No. of specimen
1.	Unloading Jetty	Pile Heads	Six (06)
		Transom	Eight (08)
		Planks / Deck	Eight (08)
2.	Access Bridge 1	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	Two (02)
3.	Access Bridge 2	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	Two (02)

2.3 CHEMICAL COMPOSITION OF CONCRETE

This test Petrographic examination provides a qualitative assessment of the chemical composition and mineral phases present in concrete. This test method was performed according to ASTM C865 This practice outlines the standard procedures for performing chemical composition of concrete examination of hardened concrete samples. Using optical microscopy and supplementary tests, the petrographer identifies the types of aggregates, cementitious materials, and reaction products within the hardened concrete. The analysis helps determine the presence of compounds such as calcium hydroxide, calcium silicate hydrates (C-S-H), unhydrated cement grains, sulphates, chlorides, carbonates, and any deleterious materials.

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This method is essential for diagnosing deterioration mechanisms, evaluating material compatibility, and confirming compliance with mix design requirements.

chemical composition of concrete test results is attached in **Annexure-3.**

Table 4: Chemical composition of Concrete

S. No	Location	Component	No. of specimen
1.	Unloading Jetty	Pile Heads	Three (03)
		Transom	Four (04)
		Planks / Deck	Three (03)
2.	Access Bridge 1	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	One (01)
3.	Access Bridge 2	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	One (01)

2.4 CARBONATION DEPTH TEST ON EXTRACTED CORES

Carbonation depth is the average distance from the surface of concrete or mortar where carbon dioxide has reduced the alkalinity of the hydrated cement. The colorless portion of the core in figure shows carbonated area of the core where pink color in core shows carbonated area i.e., concrete that retain its properties and no chemical changes occurred. Depending on the concrete quality and curing condition, the carbonation depth varies.

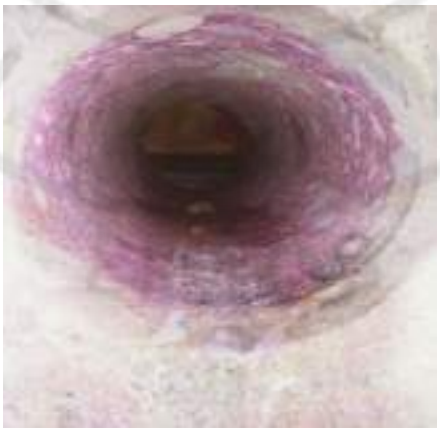

Figure 1: Carbonation Test of The Core

Carbonation is a process in which carbon dioxide from the atmosphere diffuses through the porous cover concrete and may reduce the pH to 8 or 9, at which the passivating/oxide film is no longer stable. Carbonation process involves the following two stages: First, the atmospheric carbon dioxide (CO_2) reacts with water in the concrete pores to form carbonic

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acid (H_2CO_3). This is followed by reaction of the carbonic acid with calcium hydroxide [$Ca(OH)_2$] to form calcium carbonate ($CaCO_3$). This process leads to cause a reduction in the pH value of the pore solution from 12.5 to 13.5 to around 8 to 9, which causes de-passivation of protective layer of the reinforcement bars and initiates their corrosion.

Carbonation of concrete is one of the main reasons for corrosion of reinforcement. Oxygen and moisture are the other components required for corrosion of embedded steel. The rate of carbonation depends on the grade of concrete, permeability of concrete, whether the concrete is protected or not, depth of cover, time, etc.

Detailed results are attached in **Annexure-4.**

Table 5: Carbonation Depth Test on Extracted Cores

S. No	Location	Component	No. of specimen
1.	Unloading Jetty	Pile Heads	Four (04)
		Transom	Seven (07)
		Planks / Deck	Five (05)
2.	Access Bridge 1	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	Two (02)
3.	Access Bridge 2	Pile Heads	Nil
		Transom	Two (02)
		Planks / Deck	Two (02)

2.5 DELAMINATION SURVEY OF STRUCTURAL ELEMENTS OF JETTY AND ACCESS BRIDGES

A delamination survey is conducted to identify areas within a concrete element where layers have separated due to corrosion of embedded reinforcement, poor bonding, freeze–thaw action, or other deterioration mechanisms. The survey typically involves visual inspection combined with hammer sounding or chain dragging to detect hollow or debonded zones beneath the surface. Locations exhibiting changes in sound or visible cracking/spalling are marked on the structural drawings to quantify the extent of damage. The purpose of the delamination survey is to assess the structural condition, determine repair requirements, and support the planning of appropriate rehabilitation measures.

Table 6:Terminology in Delamination Survey

S.No:	Condition of structural element	Definition	Color Identification
1.	SOUND	A condition where the structural element or material is in good condition, free from significant defects, like spalling of concrete, detachment of covers or porous concrete.	
2.	UNSOUND	A condition where the structural element or material shows defects, like spalling of concrete, detachment of concrete cover.	
3.	CRACK	A visible linear separation, fracture, or opening in a structural element.	
4.	INACCESSIBLE	Certain structural members were inaccessible due to sediment accumulation and insufficient vertical clearance beneath the bridge.	

Detailed results are attached in **Annexure-5.**

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ANNEXURE – 1: CORE EXTRACTION AND COMPRESSIVE STRENGTH TEST

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

N.E.D University of Engineering and Technology
Department Of Civil Engineering
Material Testing Laboratory

Test Results for Compressive Strength of Concrete Drilled Cores

Lab. Reference Number	NED/CCD/MTL/2025/1456
Name of Customer	M/S Velosi Integrity & Safety Pakistan (Pvt.) Ltd For M/S National Engineering Services Pakistan
No of Specimen	20 (Unloading Jetty)
Name of Project	Korangi Fish Harbour Karachi
Type of Specimens	Concrete Drilled Cores
Date of Testing	18-11-2025
Type of Testing	Testing of Compressive Strength Only
Note	1) Results pertain to the samples supplied to the laboratory. 2) The samples have been consumed during testing.

Results:

S.No	Specimen Identification	Average Diameter (inch)	Prepared Length (inch)	Cross Sectional Area (inch²)	Max. Load (Kips)	L/D Ratio	Correction Factor (For L/D Ratio)	Compressive Strength (Lbs/inch²)
1	Transom-1, Core-1	3.701	4.370	10.751	46.313	1.18	0.913	3933
2	Transom-2, Core-2		4.488		64.748	1.21	0.920	5540
3	Transom-3, Core-3		4.094		38.444	1.11	0.896	3204
4	Transom-4, Core-4		5.000		47.437	1.35	0.942	4156
5	Transom-5, Core-5		4.370		38.444	1.18	0.913	3265
6	Transom-6, Core-6		3.937		44.514	1.06	0.884	3660
7	Transom-7, Core-7		4.370		40.018	1.18	0.913	3398
8	Transom-8, Core-8		4.370		38.444	1.18	0.913	3265
9	Transom-9, Core-9		5.433		46.987	1.47	0.956	4178
10	Pile Head-1, Core-1		6.890		55.081	1.86	---	5123
11	Pile Head-2, Core-2		3.937		43.615	1.06	0.884	3586
12	Pile Head-3, Core-3		4.016		35.072	1.09	0.892	2910
13	Pile Head-4, Core-4		3.976		39.119	1.07	0.887	3228
14	Pile Head-5, Core-5		4.134		45.863	1.12	0.899	3835
15	Pile Head-6, Core-6		4.055		34.173	1.10	0.894	2841
16	Plank-1, Core-1		4.724		43.165	1.28	0.934	3750
17	Plank-2, Core-2		3.701		46.987	1.00	0.870	3802
18	Plank-3, Core-3		6.496		36.871	1.76	---	3429
19	Plank-4, Core-4		6.024		33.273	1.63	0.971	3005
20	Plank-5, Core-5		5.039		36.871	1.36	0.943	3234

Prepared By:

Engr. Amir Nizam
Principal Lab. Engineer

Verified By:

Dr. S. Salman Mobeen
Asst. Professor

Civil Engineering Department
NED UNIVERSITY OF ENGG & TECH

Supervised By:

Dr. Abdul Jabbar Sangi
Testing Supervisor

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N.E.D University of Engineering and Technology
Department Of Civil Engineering
Material Testing Laboratory

Test Results for Compressive Strength of Concrete Drilled Cores

Lab. Reference Number	NED/CCD/MTL/2025/1456A
Name of Customer	M/S Velosi Integrity & Safety Pakistan (Pvt.) Ltd For M/S National Engineering Services Pakistan
No of Specimen	08 (Bridge-1 & Bridge-)
Name of Project	Korangi Fish Harbour Karachi
Type of Specimens	Concrete Drilled Cores
Date of Testing	18-11-2025
Type of Testing	Testing of Compressive Strength Only
Note	1) Results pertain to the samples supplied to the laboratory. 2) The samples have been consumed during testing.

Results:

S.No	Specimen Identification	Average Diameter (inch)	Prepared Length (inch)	Cross Sectional Area (inch²)	Max. Load (Kips)	L/D Ratio	Correction Factor (For L/D Ratio)	Compressive Strength (Lbs/inch²)
1	Bridge-1 Transom-1, Core-1	3.701	4.213	10.751	53.732	1.14	0.904	4518
2	Bridge-1 Transom-2, Core-2		4.173		49.011	1.13	0.901	4108
3	Bridge-1 Plank-1, Core-1		6.063		32.374	1.64	0.971	2924
4	Bridge-1 Plank-2, Core-1		4.134		40.018	1.12	0.899	3346
5	Bridge-2 Transom-1, Core-1		3.819		54.182	1.03	0.877	4420
6	Bridge-2 Transom-2, Core-2		4.094		37.320	1.11	0.896	3110
7	Bridge-2 Plank-1, Core-1		5.039		47.662	1.36	0.943	4180
8	Bridge-2 Plank-2, Core-1		4.134		48.336	1.12	0.899	4042

Prepared By:
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Principal Lab. Engineer

Verified By:
Dr. S. Salman Mobeen
Asst. Professor

Supervised By:
Dr. Abdul Jabbar Sangi
Testing Supervisor

Civil Engineering Department — NED University of Engg. & Tech.

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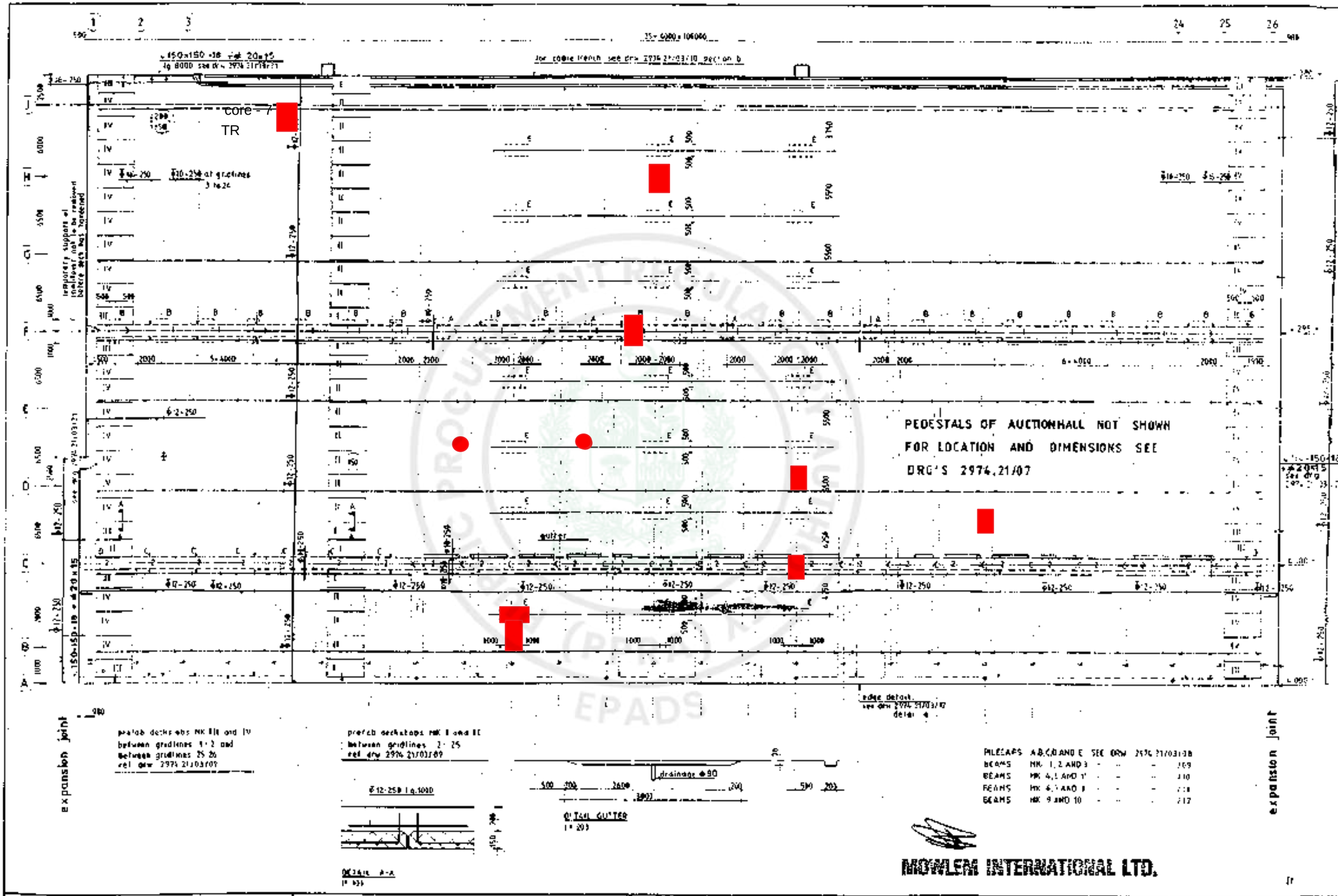

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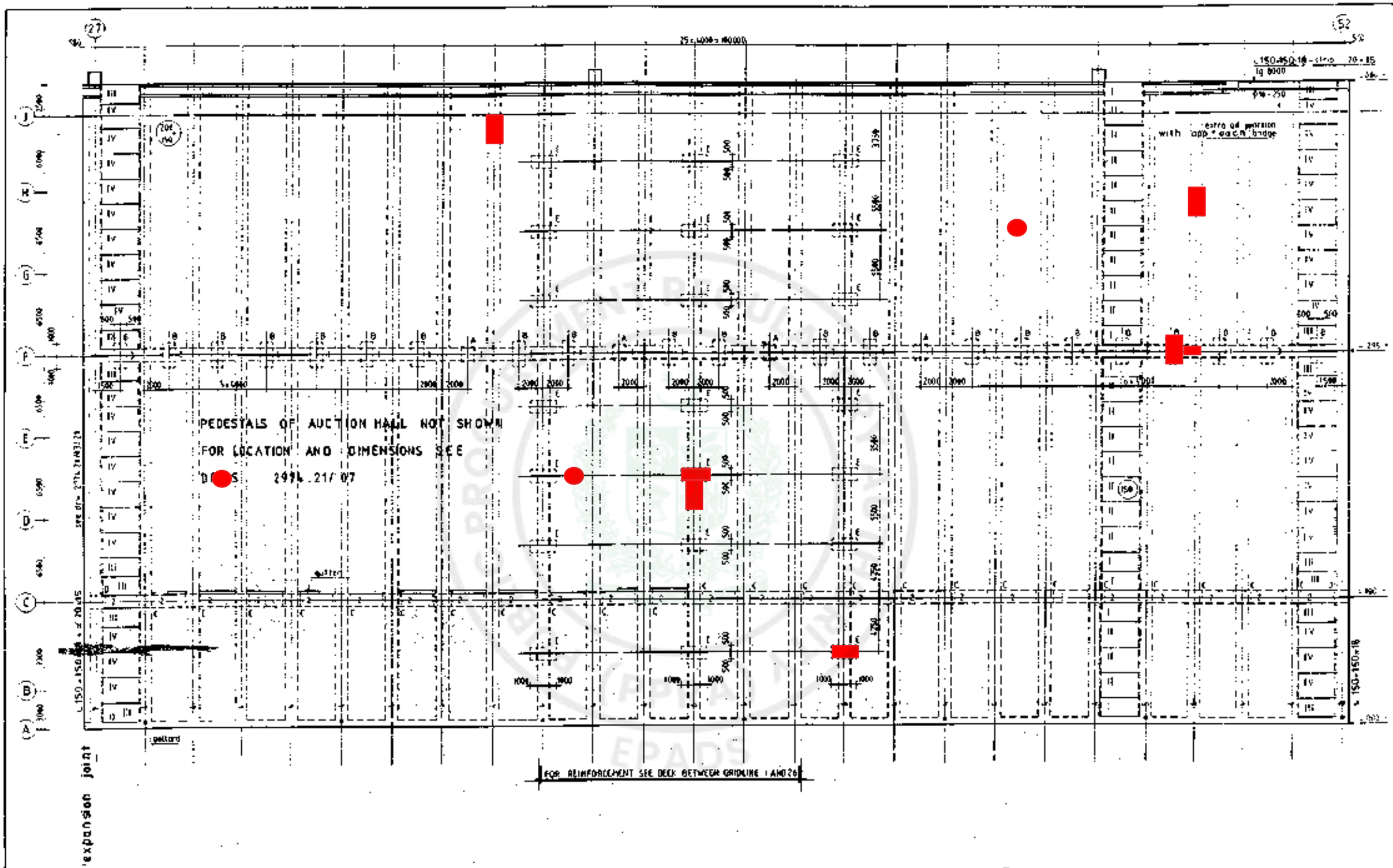
Techno - Consult
CONSULTING ENGINEERS
KARACHI

DESIGNED: AT	KORANGI FISHERIES HARBOUR PROJECT	DRG Nº
DRAWN: BMJ	JETTIES	2974 21/03/08
CHECKED:	UNLOADING JETTY	SCALE
APPROVED:	DECK DETAILS GRIDLINE	



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DRG NO 2974.21/03/07

SCALE:

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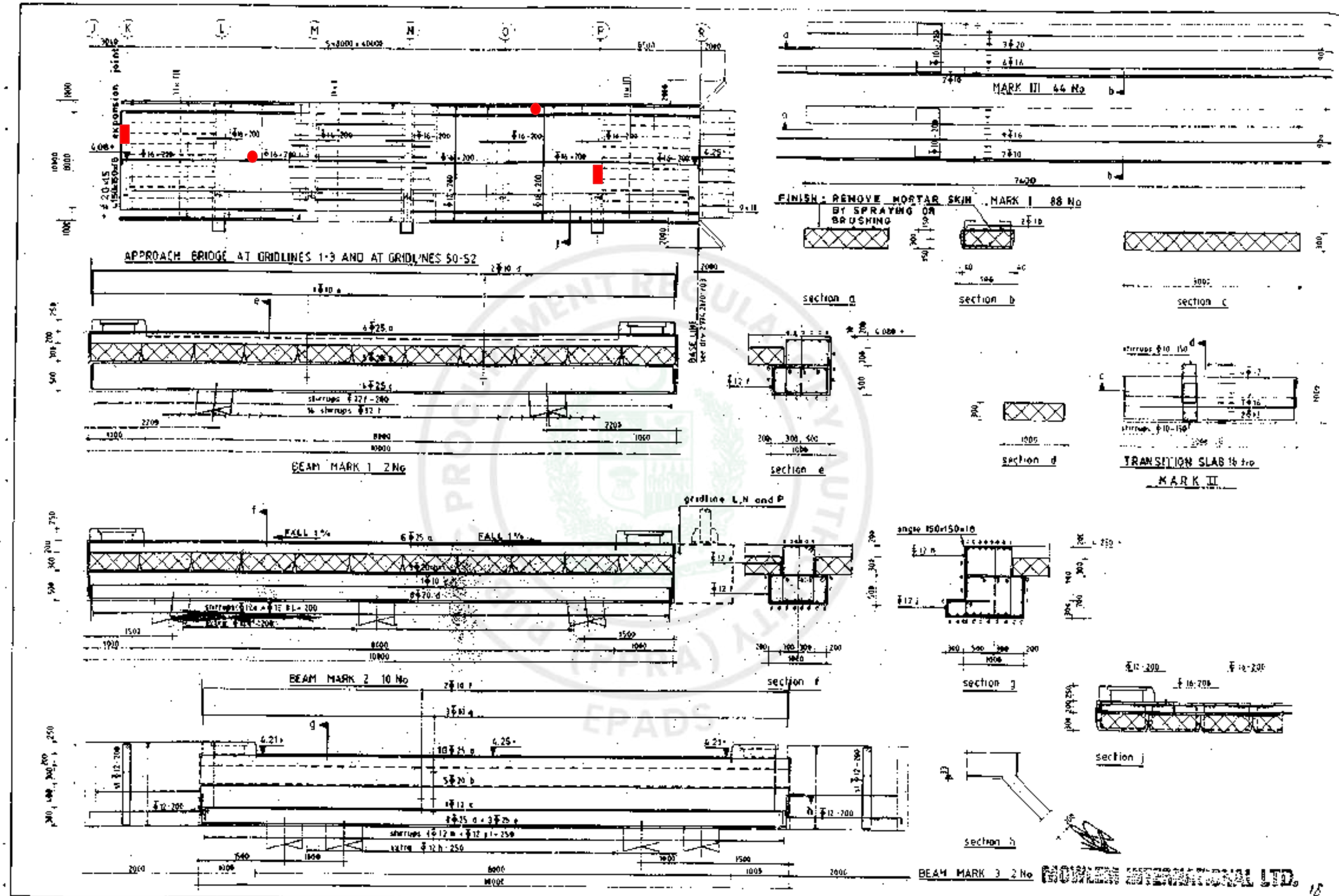

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DESIGNED : AT	KORANGI FISHERIES HARBOUR PROJECT	DRG Nº
DRAWN : BWJ	JETTIES	2974.21/03/13
CHECKED :	UNLOADING JETTY	SCALE:
APPROVED:	APPROACH BRIDGE AT GRIDLINES	

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Page 449 of 567

APPROACH BRIDGE AT GRIDLINES 1-3 AND AT GRIDLINES 50-52

BEAM MARK 1 2 No

BEAM MARK 2 10 No

BEAM MARK 3 2 No

MARK III 44 No

FINISH : REMOVE MORTAR SKIN BY SPRAYING OR BRUSHING . MARK I 88 No

section a

section b

section c

section d

section e

section f

section g

section h

section j

TRANSITION SLAB 16 no MARK II

gridline L,N and P

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Techno-Consult CONSULTING ENGINEERS KARACHI PAKISTAN

DESIGNED : AT
DRAWN : BWJ
CHECKED :
APPROVED :

KORANGI FISHERIES HARBOUR PROJECT

JETTIES

UNLOADING JETTY APPROACH BRIDGE AT GRIDLINES

ORG NO 2974.21/03/13

SCALE :

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ANNEXURE – 2: DETERMINATION OF WATER-SOLUBLE CHLORIDE IN CONCRETE BY DRILL DUST METHOD TEST

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

CHEMICAL ANALYSIS OF CONCRETE CORE SAMPLE			
S#	**Sample**	**Depth (inches)**	****Chloride Content (By weight % of cement)**
	Permissible Limits		**0.30 (Ref: ACI 318-19)**
1.	U.L SLB-1, Dr1	1″	0.08
		2″	0.07
		3″	0.06
		4″	0.04
2.	U.L Dr-2, SLB-2	1″	0.05
		2″	0.05
		3″	0.04
		4″	0.04
3.	U.L Dr-3, SLB-3	1″	0.06
		2″	0.04
		3″	0.04
		4″	0.02
4.	U.L Dr-4, SLB-4	1″	0.08
		2″	0.07
		3″	0.06
		4″	0.06
5.	U.L Dr-5, SLB-5	1″	0.03
		2″	0.03
		3″	0.03
		4″	0.03

CHEMICAL ANALYSIS OF CONCRETE CORE SAMPLE			
S#	**Sample**	**Depth (inches)**	****Chloride Content (By weight % of cement)**
6.	U.L Dr-6, SLB-6	1″	0.08
		2″	0.07
		3″	0.05
		4″	0.05
7.	U.L Dr-7, SLB-7	1″	0.03
		2″	0.03
		3″	0.03
		4″	0.02
8.	U.L Dr-8, SLB-8	1″	0.02
		2″	0.02
		3″	0.03
		4″	0.02
9.	U.L Dr-1, PC-1	1″	0.03
		2″	0.02
		3″	0.02
		4″	0.02
10.	U.L Dr-2, PC-2	1″	0.04
		2″	0.04
		3″	0.04
		4″	0.04
11.	U.L Dr-3, PC-3	1″	0.05

CHEMICAL ANALYSIS OF CONCRETE CORE SAMPLE			
S#	**Sample**	**Depth (inches)**	****Chloride Content (By weight % of cement)**
		2″	0.03
		3″	0.02
		4″	0.02
12.	U.L Dr-4, PC-4	1″	0.04
		2″	0.03
		3″	0.03
		4″	0.03
13.	U.L Dr-5, PC-5	1″	0.04
		2″	0.02
		3″	0.01
		4″	0.01
14.	U.L Dr-6, PC-6	1″	0.01
		2″	0.01
		3″	0.01
		4″	0.02
15.	U.L Dr-1, Tr-1	1″	0.04
		2″	0.03
		3″	0.03
		4″	0.02
16.	U.L Dr-2, Tr-2	1″	0.05
		2″	0.03

CHEMICAL ANALYSIS OF CONCRETE CORE SAMPLE			
S#	**Sample**	**Depth (inches)**	****Chloride Content (By weight % of cement)**
		3″	0.03
		4″	0.02
17.	U.L Dr-3, Tr-3	1″	0.04
		2″	0.03
		3″	0.03
		4″	0.03
18.	U.L Dr-4, Tr-4	1″	0.03
		2″	0.03
		3″	0.03
		4″	0.03
19.	U.L Dr-5, Tr-5	1″	0.02
		2″	0.02
		3″	0.01
		4″	0.01
20.	U.L Dr-6, Tr-6	1″	0.05
		2″	0.04
		3″	0.03
		4″	0.03
21.	U.L Dr-7, Tr-7	1″	0.06
		2″	0.04
		3″	0.04

CHEMICAL ANALYSIS OF CONCRETE CORE SAMPLE			
S#	**Sample**	**Depth (inches)**	****Chloride Content (By weight % of cement)**
		4″	0.03
22.	U.L Dr-8, Tr-8	1″	0.2
		2″	0.2
		3″	0.2
		4″	0.05
23.	Br-2 Tr-1, Dr-1	1″	0.02
		2″	0.01
		3″	0.01
		4″	0.01
24.	Br-2 Tr-2, Dr-2	1″	0.04
		2″	0.02
		3″	0.02
		4″	0.02
25.	Br-1 SLB-1, Dr-1	1″	0.05
		2″	0.03
		3″	0.02
		4″	0.01
26.	Br-1 SLB-2, Dr-2	1″	0.08
		2″	0.06
		3″	0.05
		4″	0.04

CHEMICAL ANALYSIS OF CONCRETE CORE SAMPLE			
S#	**Sample**	**Depth (inches)**	****Chloride Content (By weight % of cement)**
27.	Br-1 Tr-1, Dr-1	1″	0.06
		2″	0.05
		3″	0.04
		4″	0.05
28.	Br-1 Tr-2, Dr-1	1″	0.05
		2″	0.05
		3″	0.05
		4″	0.02
29.	Br-2 SLB-1, Dr-1	1″	0.02
		2″	0.02
		3″	0.02
		4″	0.02
30.	Br-2 SLB-2, Dr-2	1″	0.02
		2″	0.02
		3″	0.02
		4″	0.04
U.L=Unloading, SLB=Slab, Br=Bridge, Dr=Drilling, Tr=Transom, Pc=Pile cap			
Testing Standard: BS 1881: Part 124			
Comments: ** Chloride content was found under allowable limits. (Ref: ACI 318-19)			

PEDESTALS OF AUCTIONHALL NOT SHOWN
FOR LOCATION AND DIMENSIONS SEE
DRG'S 2974.21/07

expansion joint

precast decktops MK III and IV
between gridlines 1 - 2 and
between gridlines 25 26
ref. drw 2974.21/03/09

precast decktops MK I and II
between gridlines 2 - 25
ref. drw 2974.21/03/09

drainage Φ90

Φ12-250 l.g.1000

DETAIL GUTTER
1" = 20"

DETAIL A-A
1" = 10"

edge detail
see drw 2974.21/03/12
detail 4

PILECAPS	A,B,C,D AND E	SEE DRW	2974.21/03/08	
BEAMS	MK 1, 2 AND 3	-	"	- 109
BEAMS	MK 4, 5 AND 7	-	"	- 110
BEAMS	MK 6, 7 AND 8	-	"	- 111
BEAMS	MK 9 AND 10	-	"	- 112

expansion joint

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DESIGNED : AT	KORANGI FISHERIES HARBOUR PROJECT	DRG NO	
DRAWN : BMJ	JETTIES	2974.21/03/08	
CHECKED :	UNLOADING JETTY	SCALE	

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PEDESTALS OF AUCTION HALL NOT SHOWN
FOR LOCATION AND DIMENSIONS SEE
DRG'S 2974.21/07

FOR REINFORCEMENT SEE DECK BETWEEN GRIDLINE 1 AND 26

expansion joint

with apron each bridge

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DESIGNED : A.I	KORANGI FISHERIES HARBOUR PROJECT	DRG NO
DRAWN : B.W.J	JETTIES	2974.21/03/07
CHECKED :	UNLOADING JETTY DECK BETWEEN GRIDLINE	SCALE:
APPROVED:		

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APPROACH BRIDGE AT GRIDLINES 1-3 AND AT GRIDLINES 50-52

BEAM MARK 1 2 Nos

BEAM MARK 2 10 Nos

BEAM MARK 3 2 Nos

MARK III 44 Nos

FINISH : REMOVE MORTAR SKIN BY SPRAYING OR BRUSHING . MARK I 88 Nos

section a

section b

section c

section d

section e

section f

section g

section h

section j

TRANSITION SLAB 16 nos MARK II

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APPROVED :

KORANGI FISHERIES HARBOUR PROJECT
JETTIES
UNLOADING JETTY
APPROACH BRIDGE AT GRIDLINES

DRG NO
2974.21/03/13

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APPROACH BRIDGE AT GRIDLINES 1-3 AND AT GRIDLINES 50-52

BEAM MARK 1 2 No

MARK III 44 No

FINISH : REMOVE MORTAR SKIN BY SPRAYING OR BRUSHING

MARK I 88 No

section a

section b

section c

section d

section e

TRANSITION SLAB 1b fro MARK II

gridline L,N and P

section f

section g

section h

section j

BEAM MARK 2 10 No

BEAM MARK 3 2 No

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DESIGNED : AT
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KORANGI FISHERIES HARBOUR PROJECT
JETTIES
UNLOADING JETTY
APPROACH BRIDGE AT GRIDLINES

DRG NO
2974.21/03/13

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ANNEXURE – 3: CHEMICAL COMPOSITION OF CONCRETE TEST

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

1. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
PC-1 Unloading	Velosi-A

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

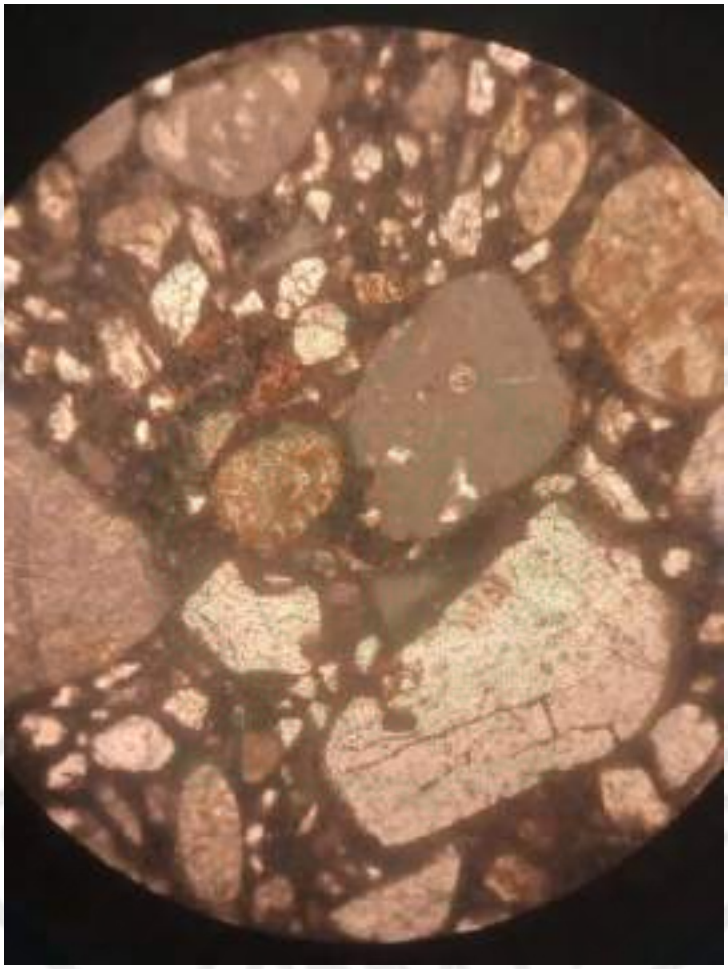
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

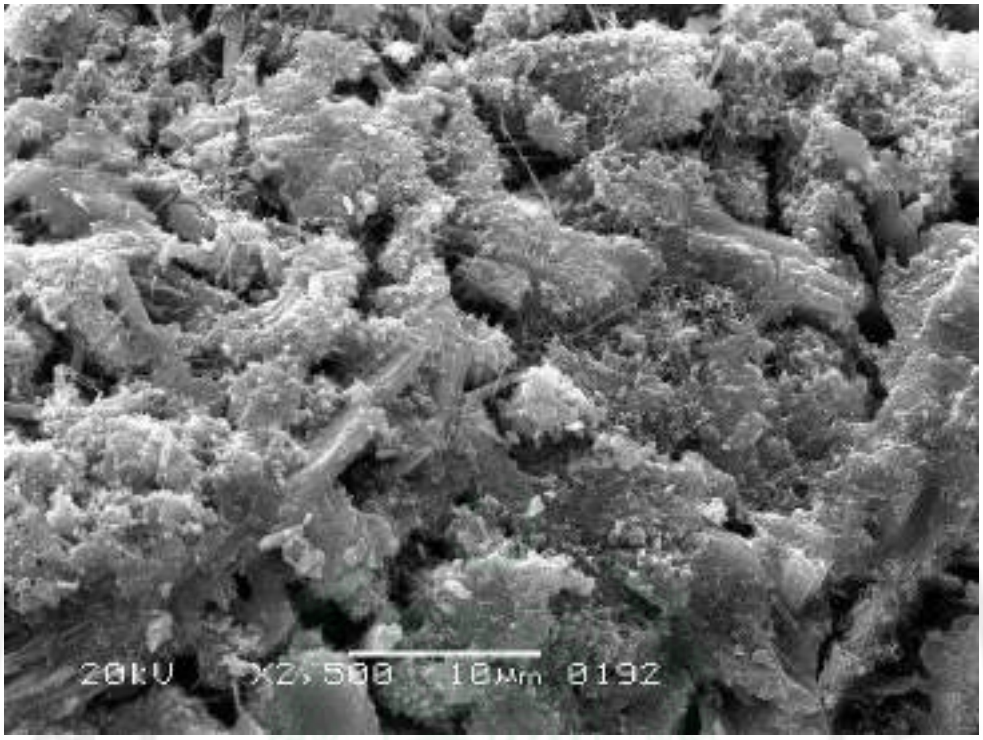
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

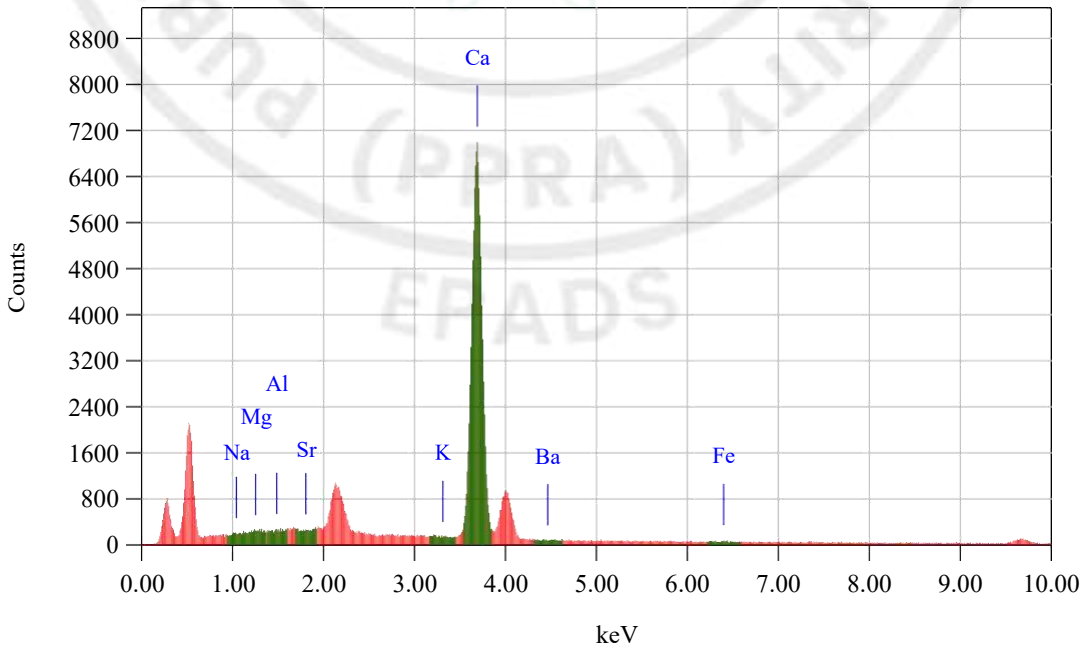


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5426

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.12						
Na K	1.041	0.28	1.27	0.35	Na2O	0.38	0.17	0.1835
Mg K	1.253	0.21	1.16	0.49	MgO	0.35	0.12	0.1268
Al K	1.486	0.15	1.14	0.16	Al2O3	0.29	0.08	0.1158
K K	3.312	1.04	0.65	0.76	K2O	1.25	0.36	1.5901

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.73%.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

2. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
PC-1 Unloading	Velosi-B

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

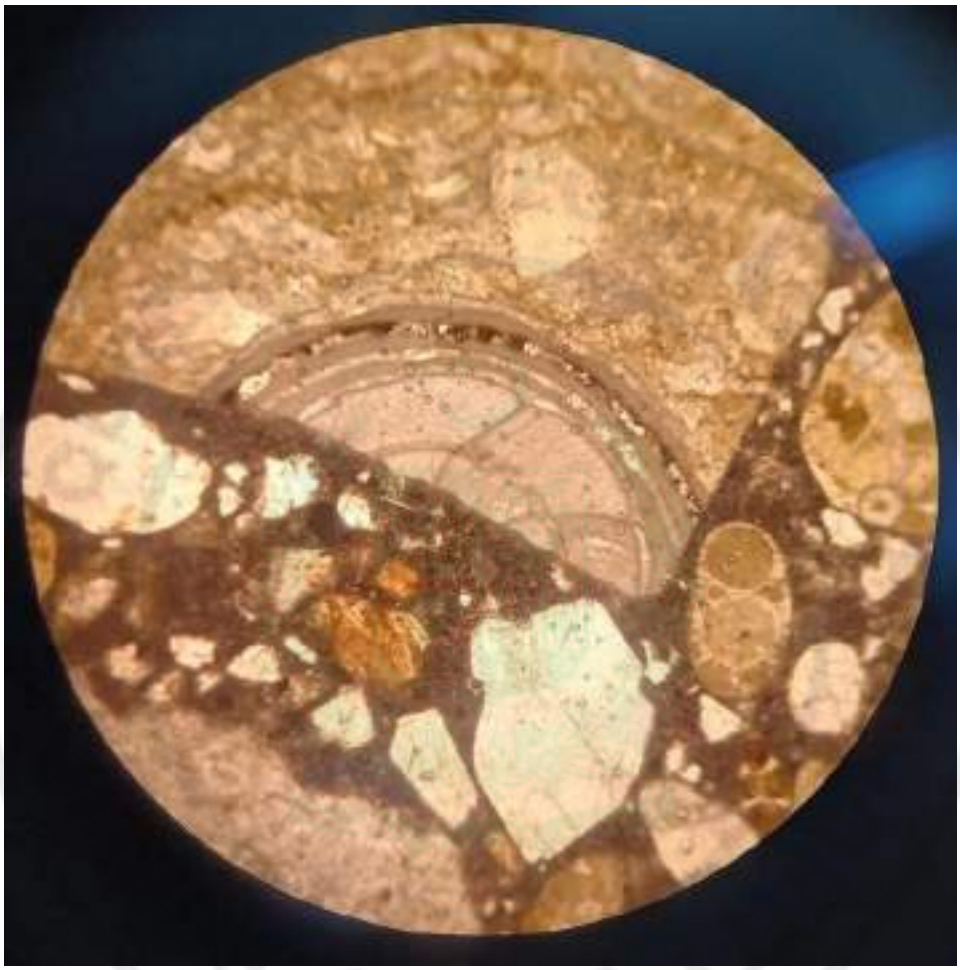
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

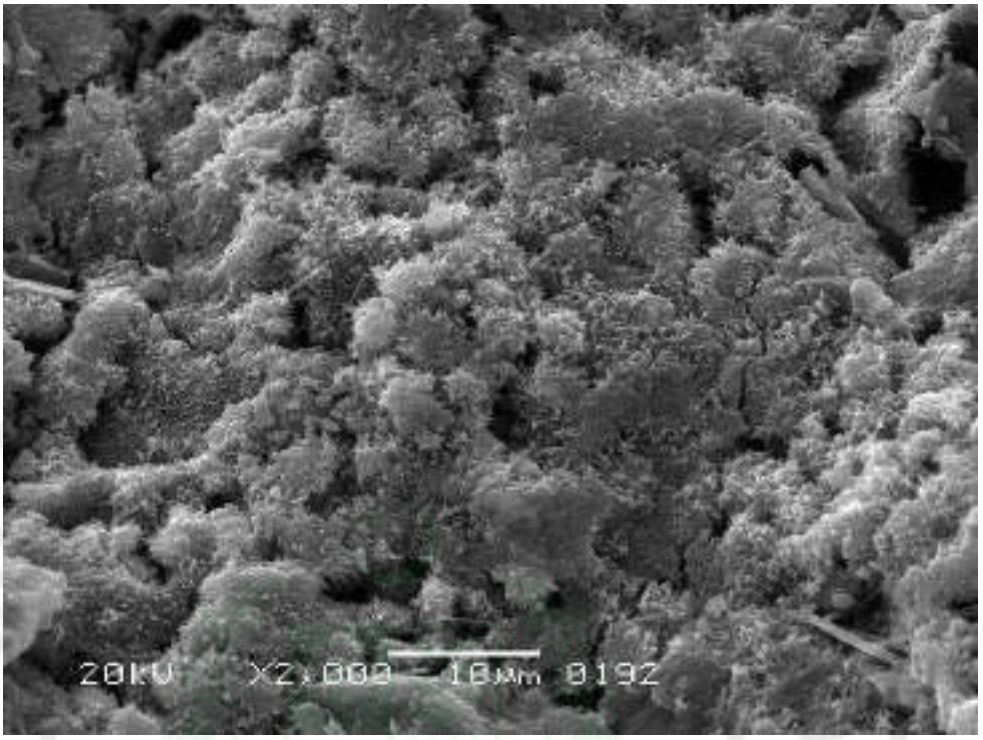
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

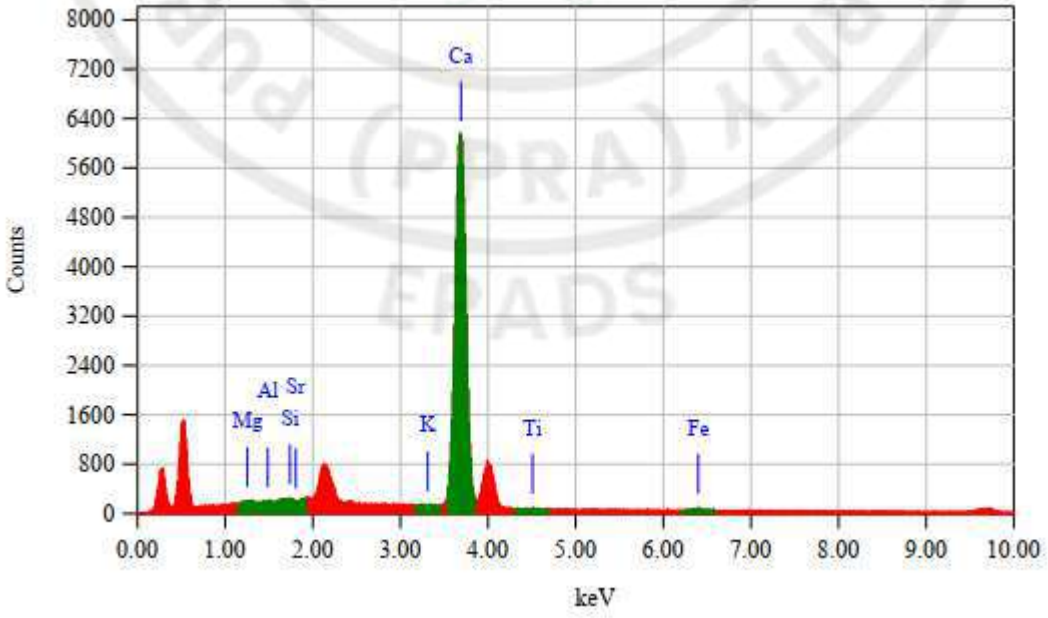


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5354

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.29						
Mg K	1.253	0.26	1.13	0.61	MgO	0.43	0.14	0.1561
Al K	1.486	0.18	1.12	0.19	Al2O3	0.33	0.09	0.1326
Si K	1.739	0.19	1.42	0.39	SiO2	0.41	0.09	0.1807
K K	3.312	1.01	0.62	0.74	K2O	1.22	0.35	1.5631
Ca K	3.690	67.85	0.96	96.51	CaO	94.93	22.98	95.8070

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.12%.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

3. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
PC-5 Unloading	Velosi-C

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

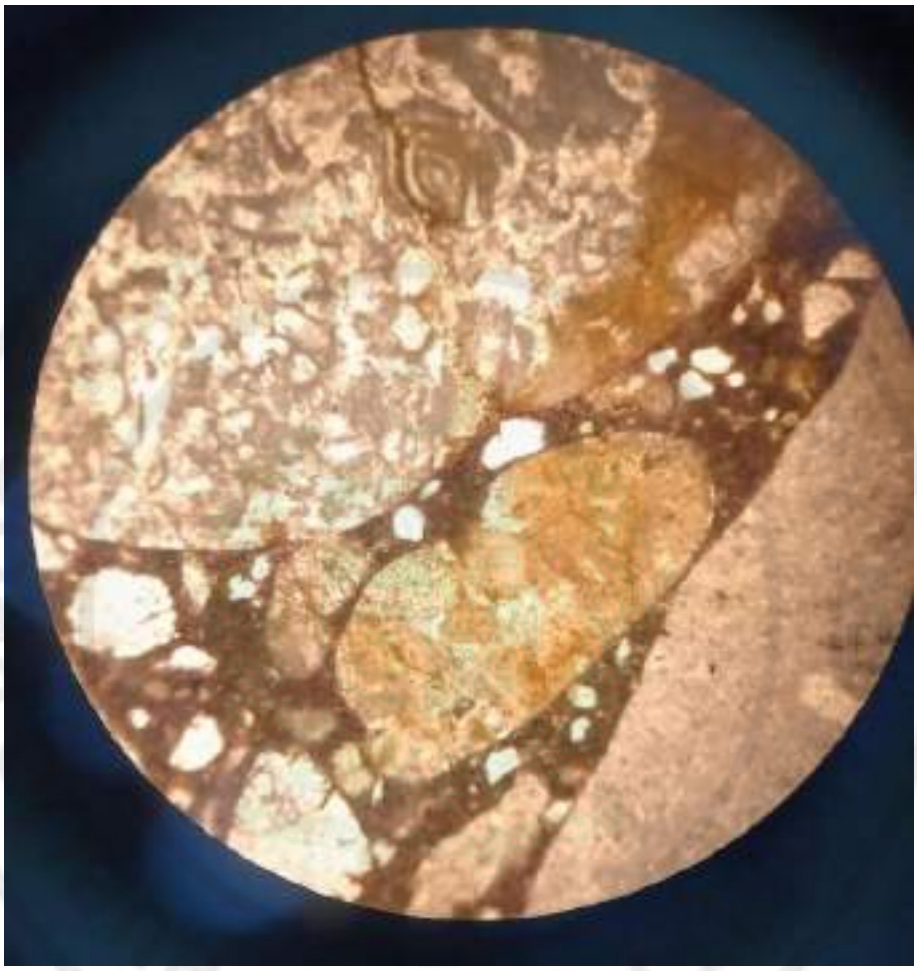
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

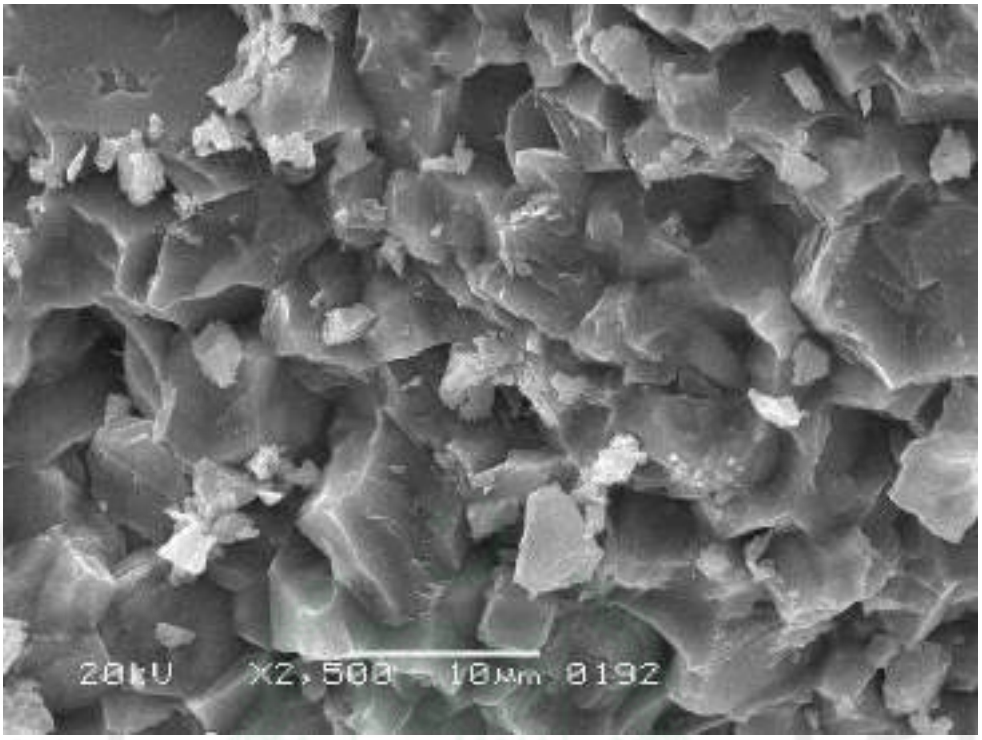
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

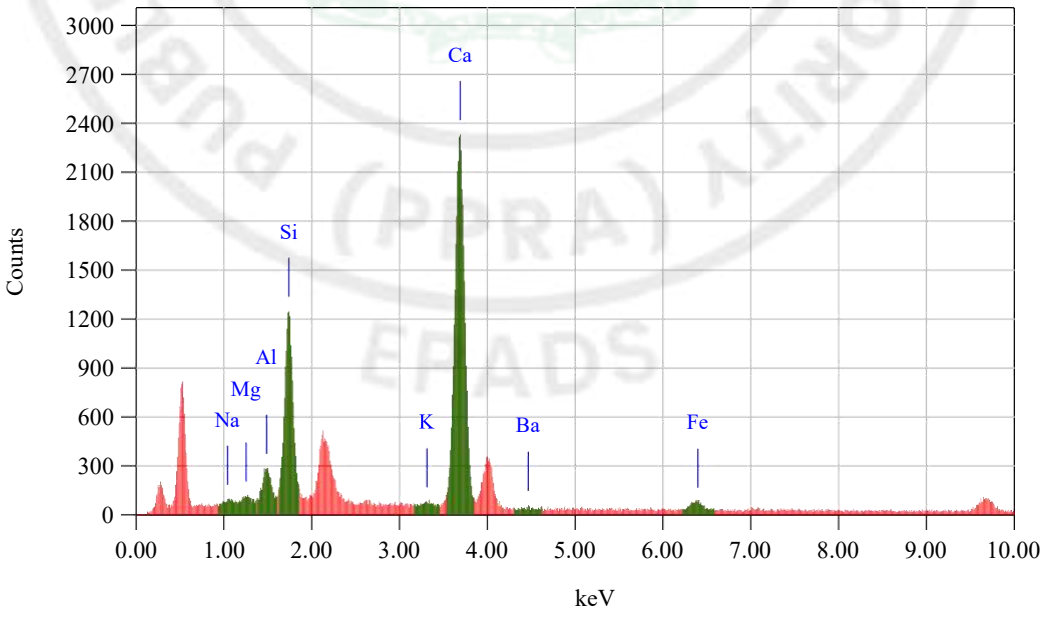


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5268

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		36.01						
Na K	1.041	0.45	0.78	0.59	Na2O	0.61	0.21	0.4096
Mg K	1.253	0.68	0.72	1.68	MgO	1.13	0.30	0.5645
Al K	1.486	2.88	0.72	3.19	Al2O3	5.44	1.14	2.9281
Si K	1.739	13.22	0.79	28.13	SiO2	28.28	5.02	16.0150

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 17.1 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

4. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Transam-02 Unloading Jetty	Velosi-D

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

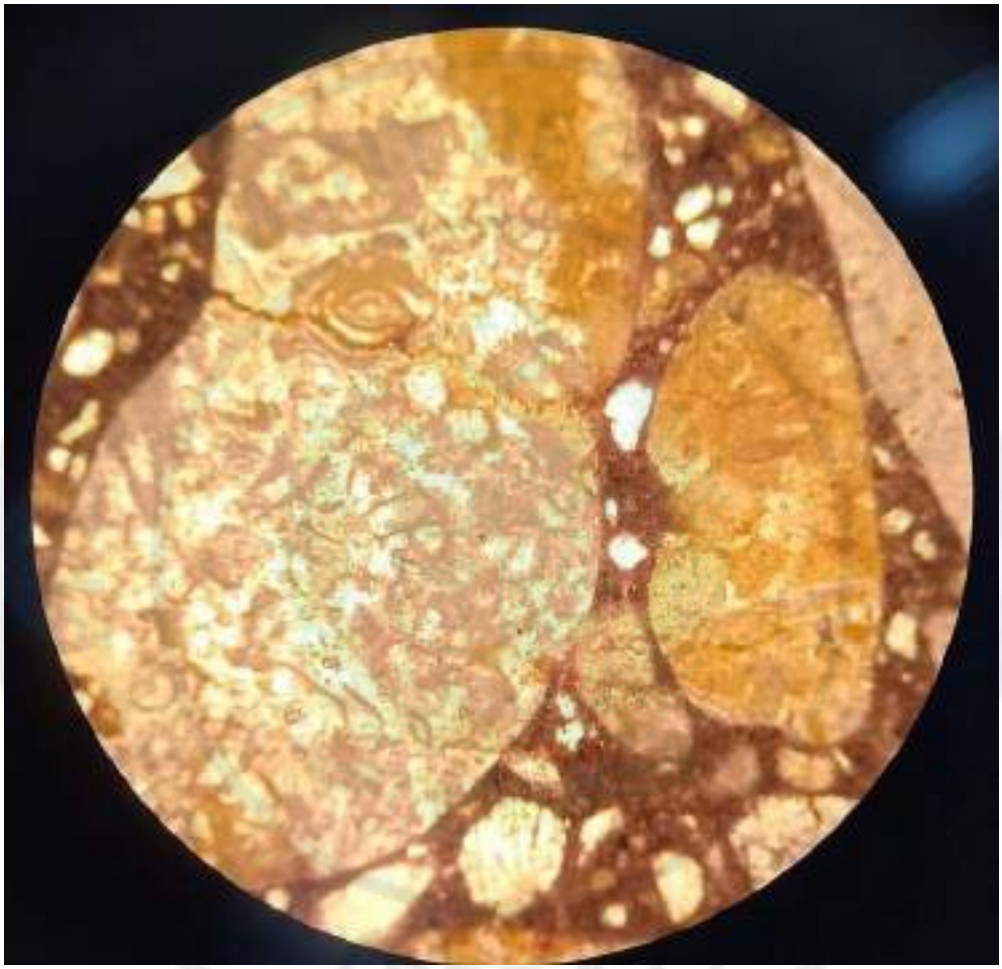
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

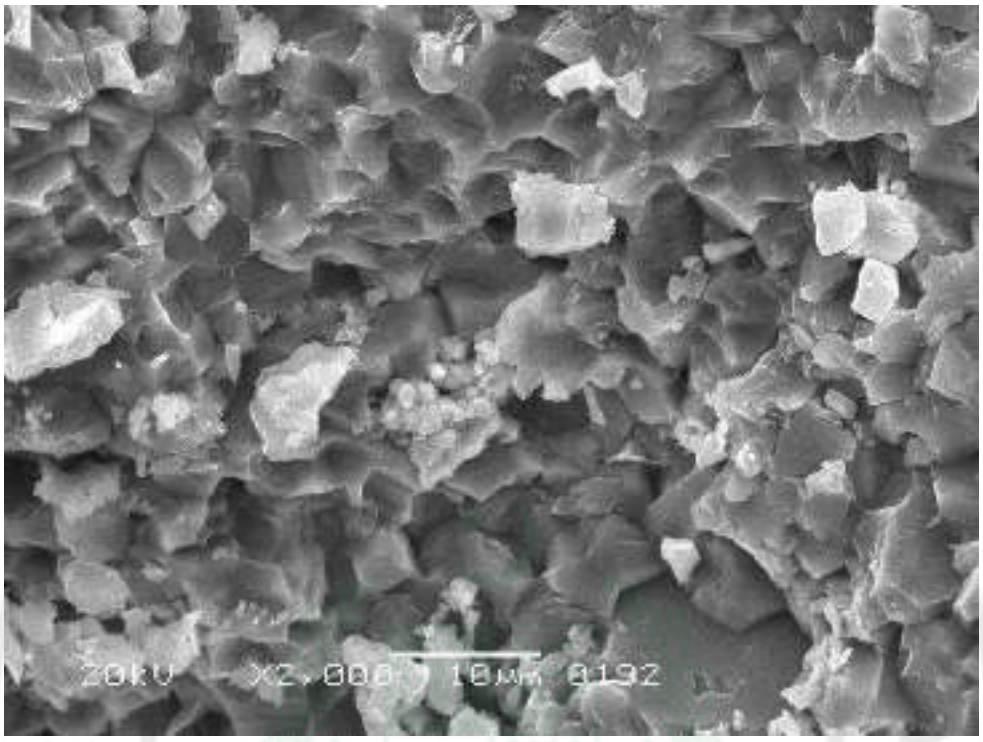
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

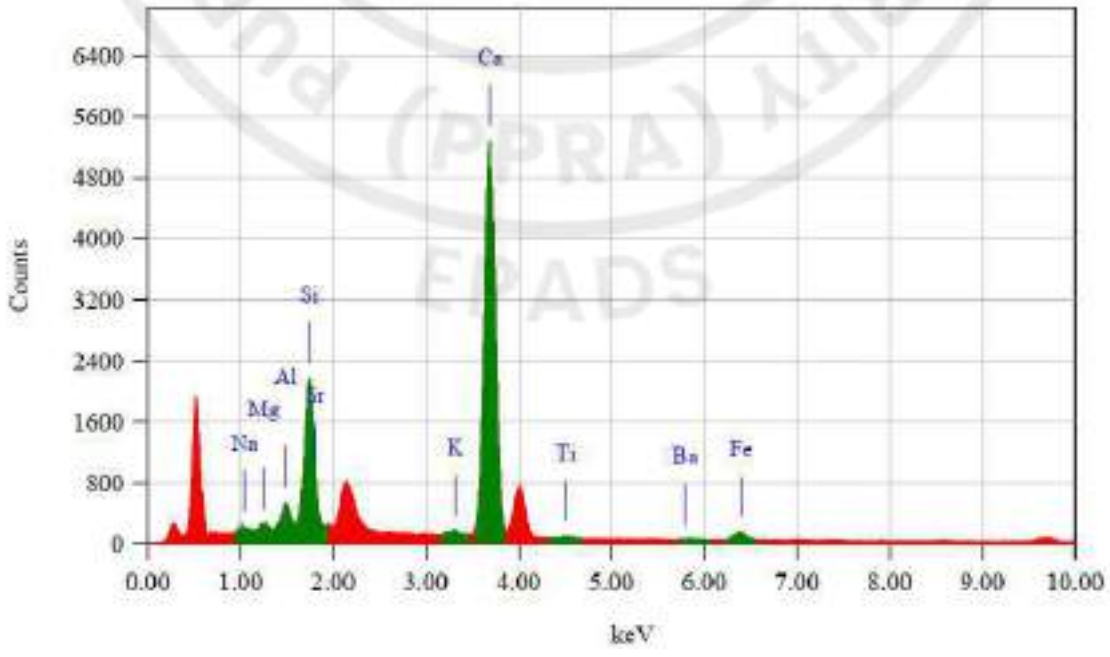


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.4985

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		34.57						
Na K	1.041	0.65	0.85	0.84	Na2O	0.88	0.31	0.5521
Mg K	1.253	0.70	0.79	1.70	MgO	1.16	0.32	0.5440
Al K	1.486	2.26	0.79	2.48	Al2O3	4.27	0.93	2.1712
Si K	1.739	10.68	1.04	22.46	SiO2	22.84	4.22	12.3393
K K	3.312	1.08	0.50	0.82	K2O	1.30	0.31	1.8523
Ca K	3.690	46.02	0.72	67.85	CaO	64.39	12.75	77.3541

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.90 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

5. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Transam-04 Unloading Jetty	Velosi-E

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

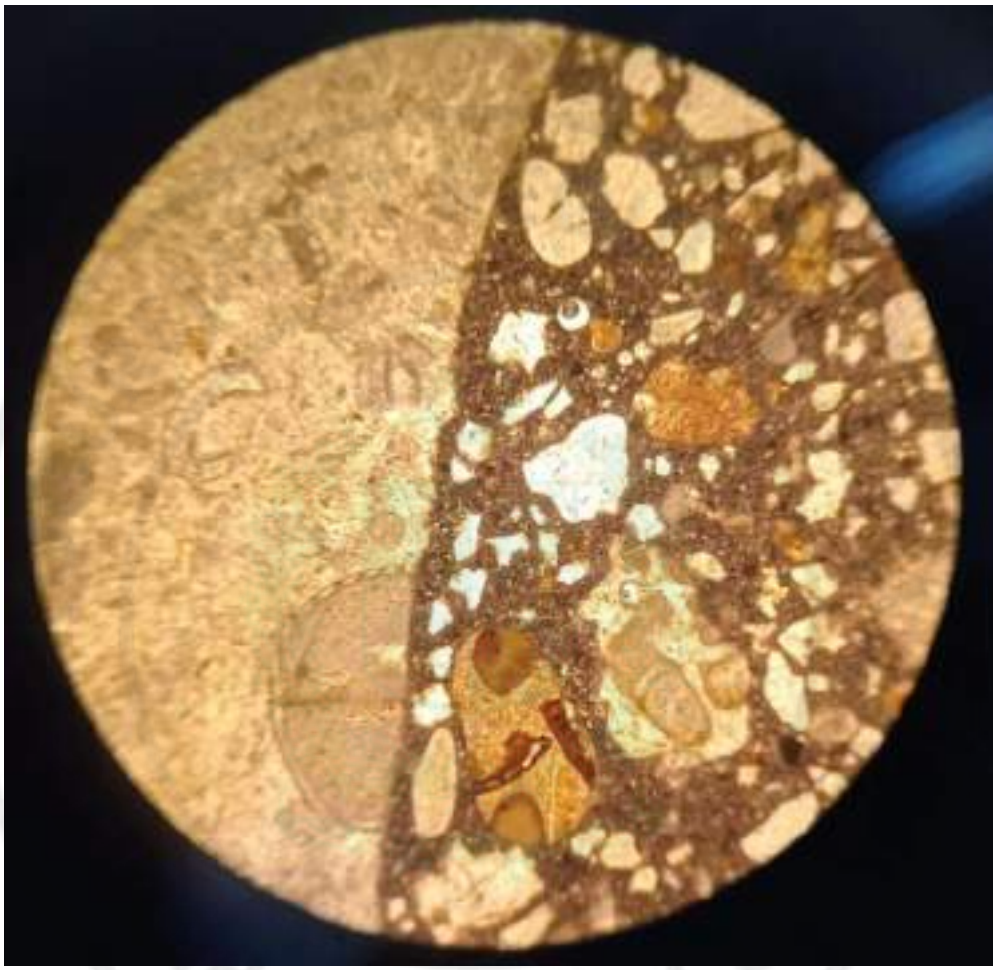
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

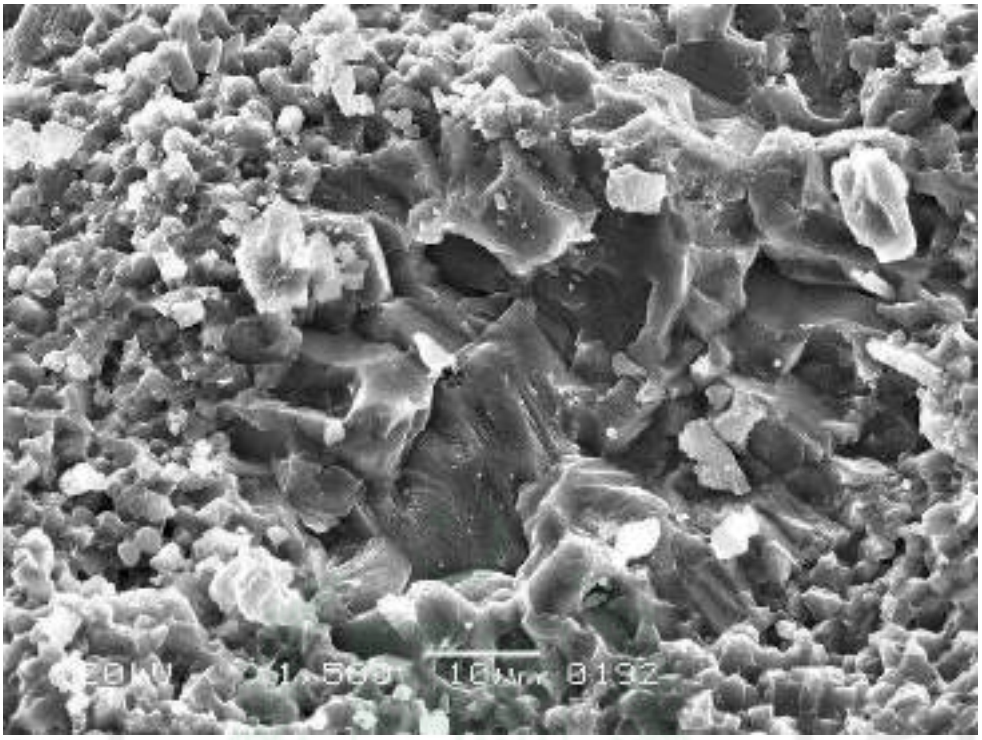
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

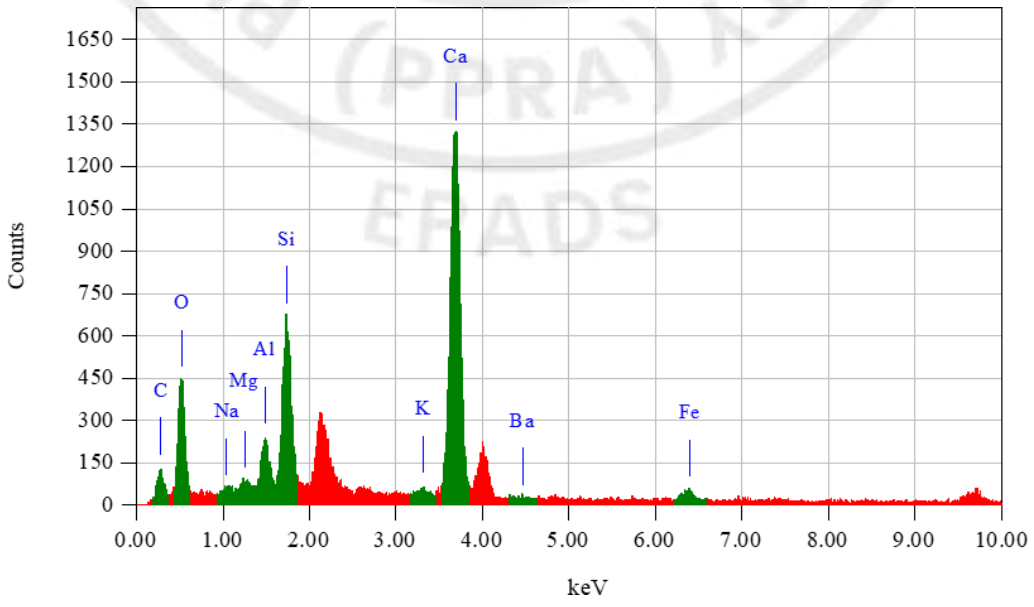


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.4479

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
C K	0.277	13.79	0.31	44.47	C	13.79	0.00	5.8581
O		30.67						
Na K*	1.041	0.70	0.51	0.59	Na2O	0.95	0.38	0.7092
Mg K*	1.253	0.81	0.48	1.29	MgO	1.34	0.42	0.7433
Al K	1.486	3.42	0.48	2.46	Al2O3	6.47	1.59	3.8459
Si K	1.739	10.01	0.53	13.80	SiO2	21.41	4.46	13.2208

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.11%.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

6. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Transam-04 Unloading Jetty	Velosi-E

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

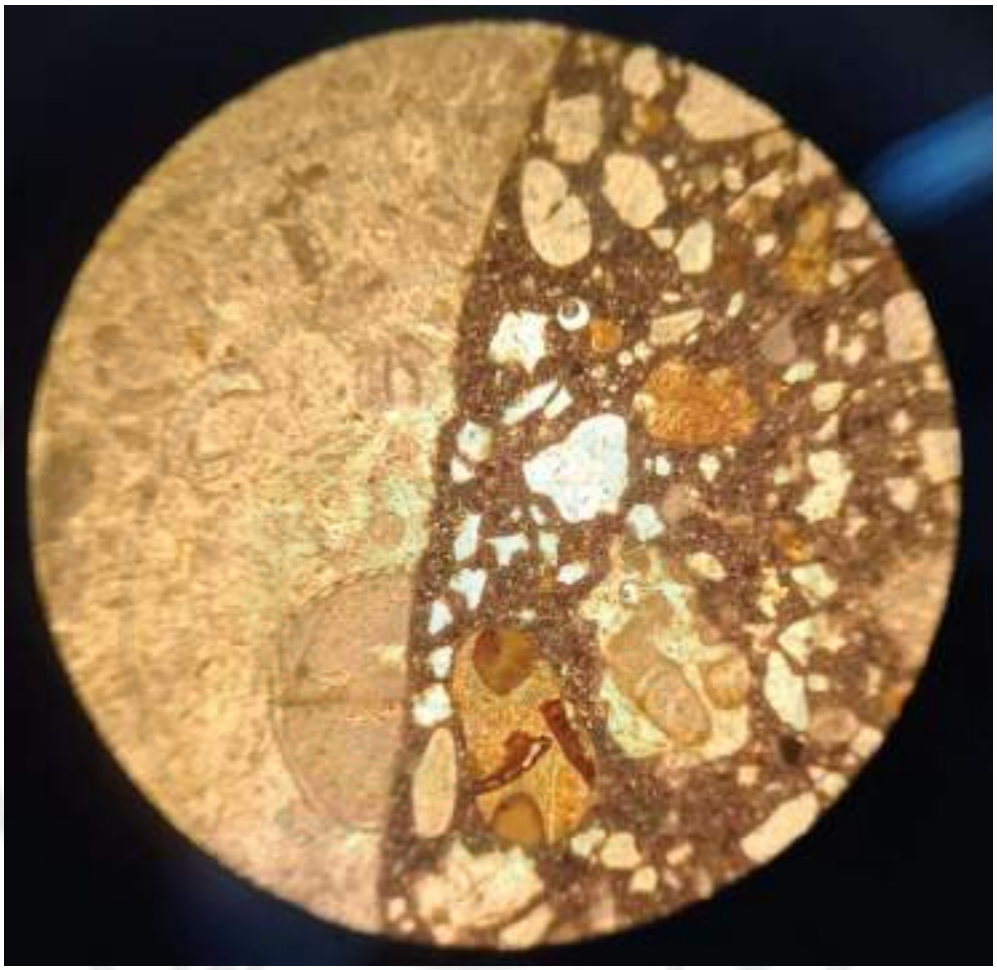
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

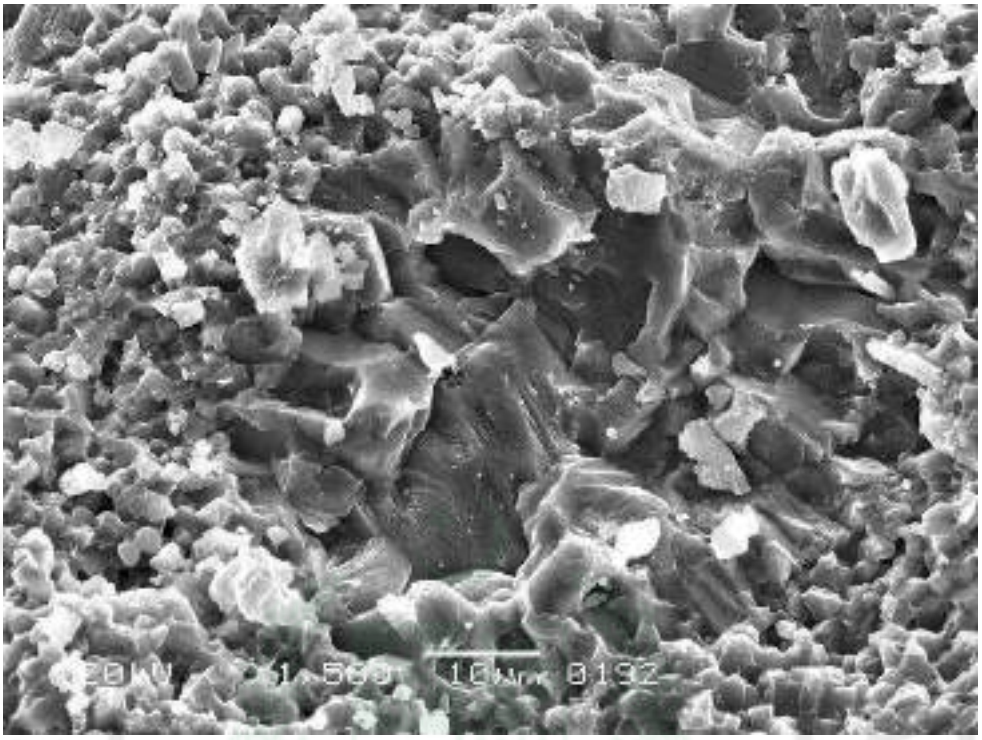
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

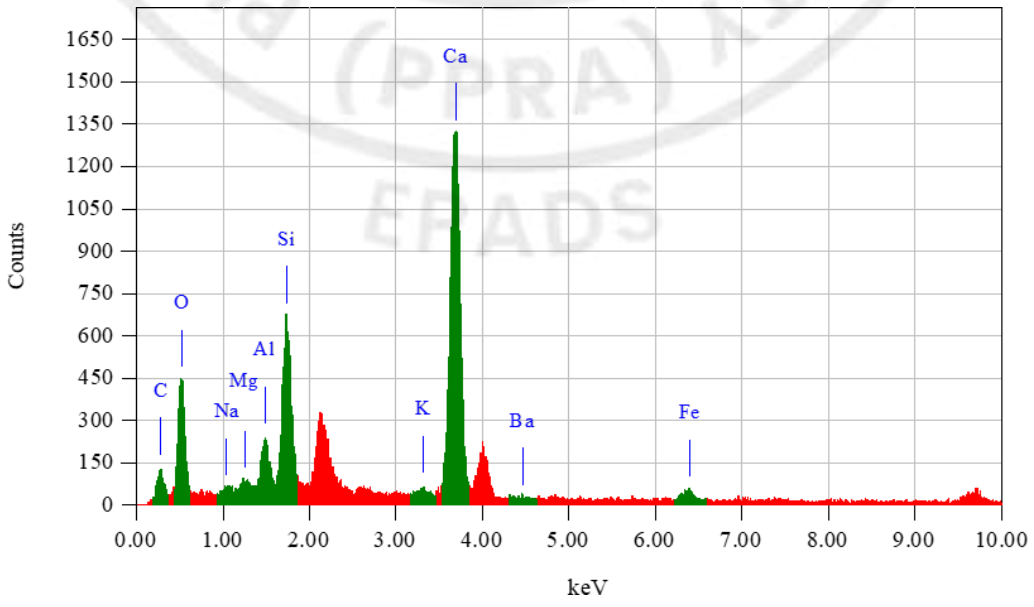


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.4479

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
C K	0.277	13.79	0.31	44.47	C	13.79	0.00	5.8581
O		30.67						
Na K*	1.041	0.70	0.51	0.59	Na2O	0.95	0.38	0.7092
Mg K*	1.253	0.81	0.48	1.29	MgO	1.34	0.42	0.7433
Al K	1.486	3.42	0.48	2.46	Al2O3	6.47	1.59	3.8459
Si K	1.739	10.01	0.53	13.80	SiO2	21.41	4.46	13.2208

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.11%.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

7.SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Transam-01 Unloading KOHFA	Velosi-G

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

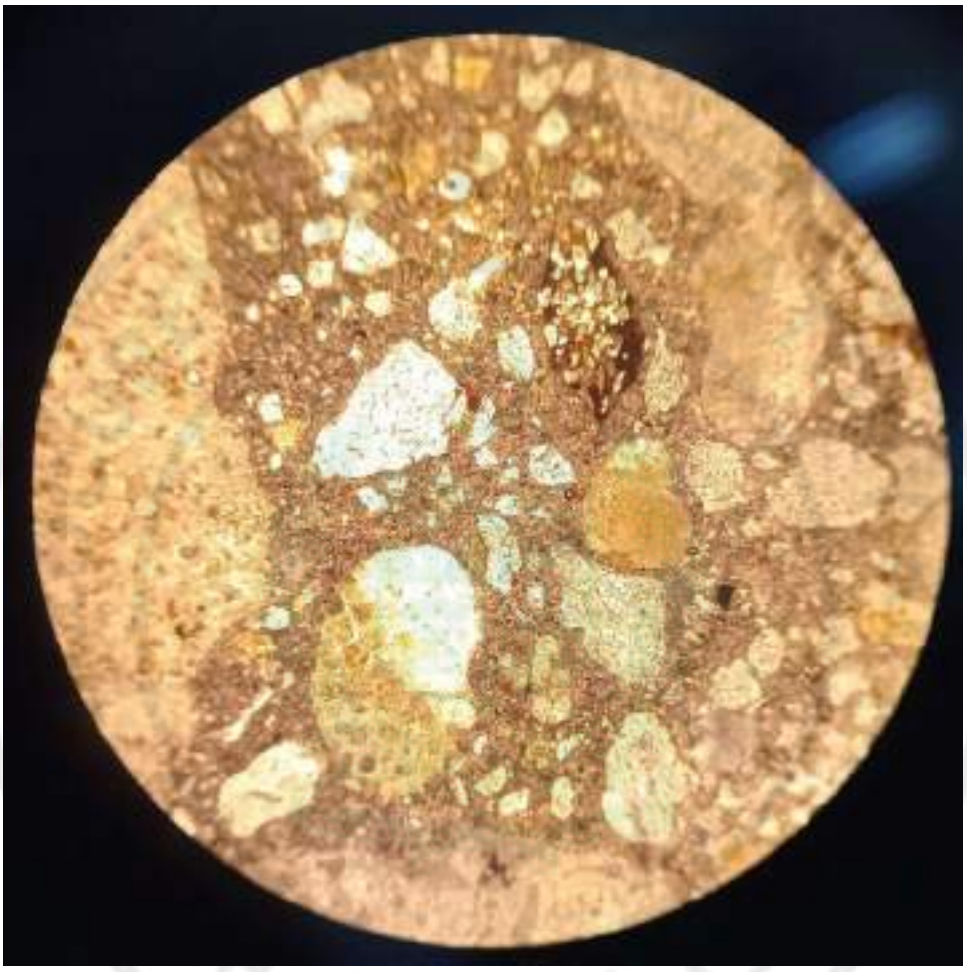
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

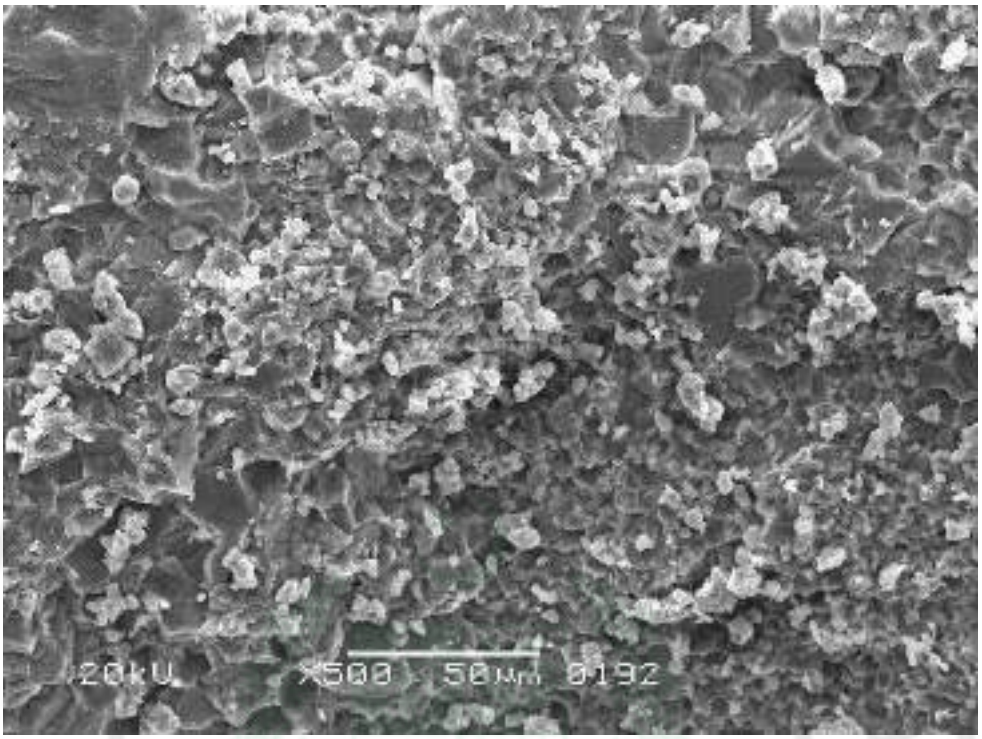
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

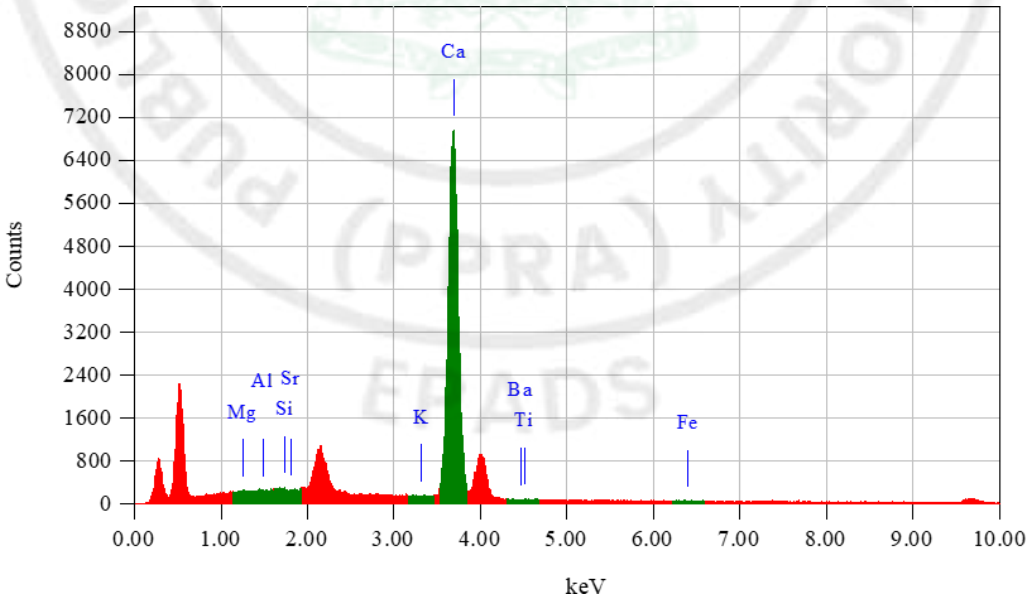


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5422

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.44						
Mg K	1.253	0.38	1.17	0.89	MgO	0.64	0.21	0.2353
Al K	1.486	0.11	1.15	0.12	Al2O3	0.21	0.06	0.0858
Si K*	1.739	0.19	1.47	0.38	SiO2	0.40	0.09	0.1786
K K	3.312	0.97	0.65	0.70	K2O	1.16	0.33	1.4898
Ca K	3.690	68.75	1.00	97.13	CaO	96.20	23.16	96.7881

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.57 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

8. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Plank-02 C-2 Unloading	Velosi-H

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

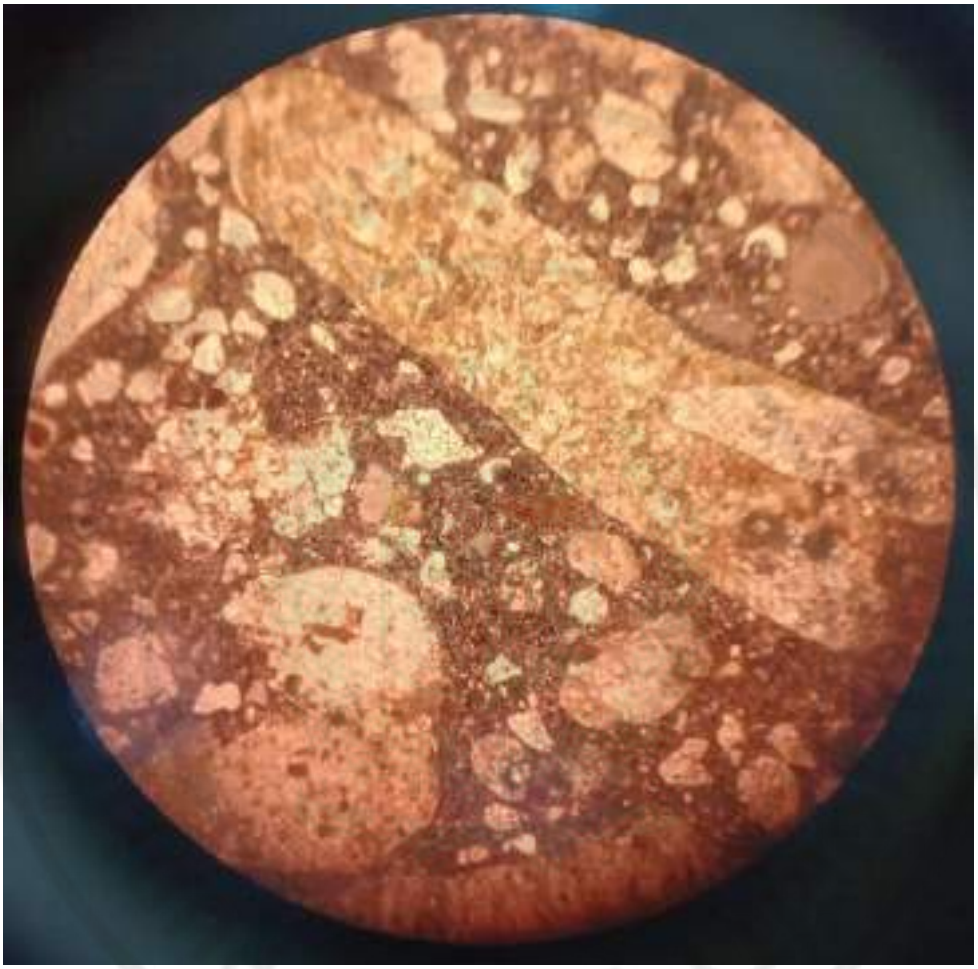
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

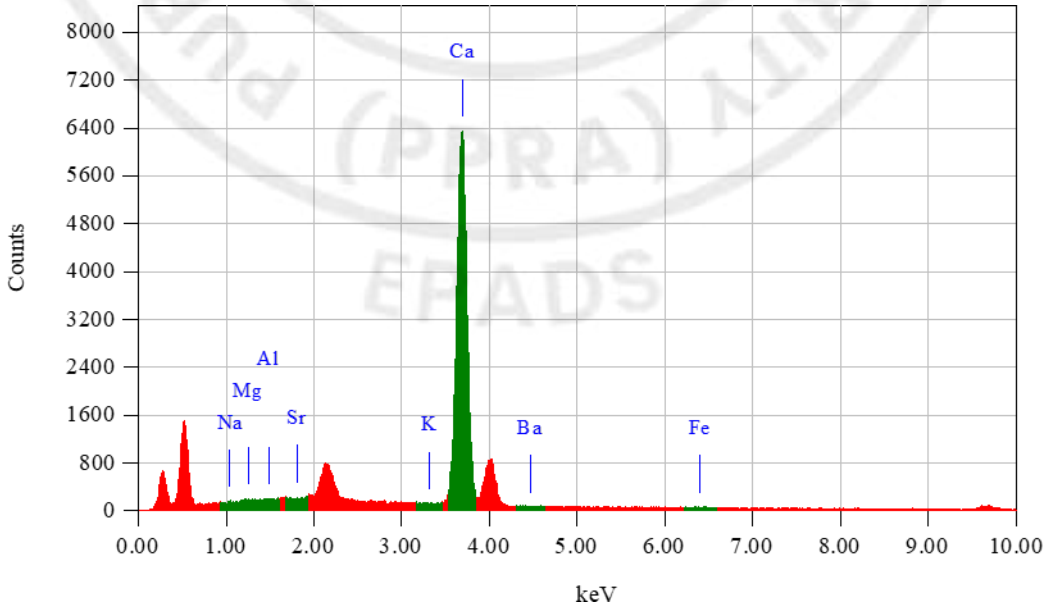
Photomicrographs of Thin section



Magnification view of sample thin section at 4x magnification.

General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5128

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.18						
Na K*	1.041	0.39	1.14	0.48	Na2O	0.52	0.23	0.2536
Mg K	1.253	0.02	1.05	0.04	MgO	0.03	0.01	0.0107
Al K	1.486	0.13	1.03	0.14	Al2O3	0.25	0.07	0.1011
K K	3.312	1.03	0.58	0.75	K2O	1.25	0.36	1.5899

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 17.3 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

9. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Plank-05 Unloading	Velosi-I

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

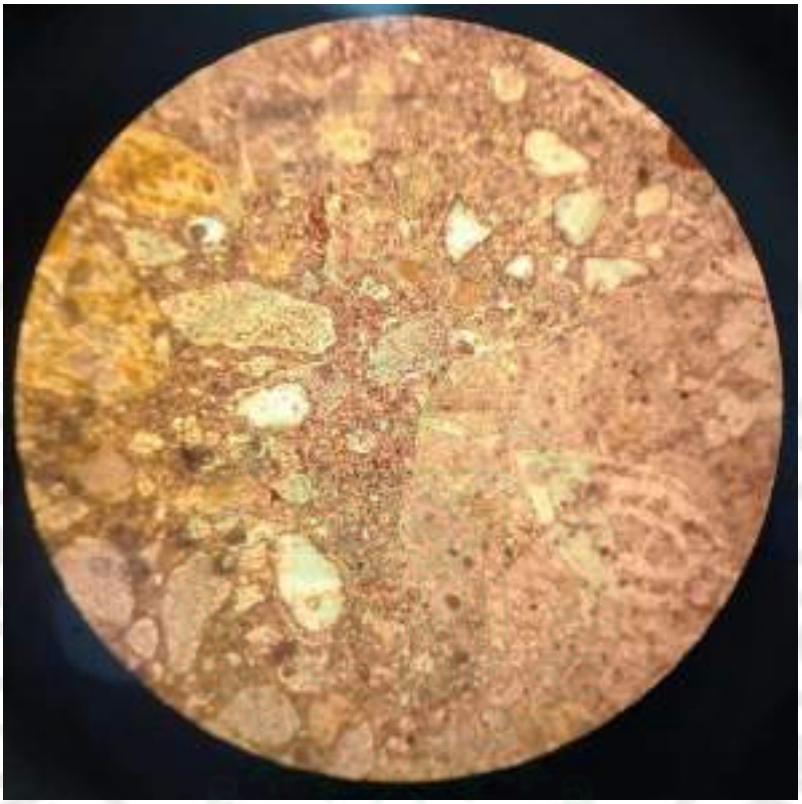
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

Un carbonated Binder	
Cement Type	Ordinary Portland Cement

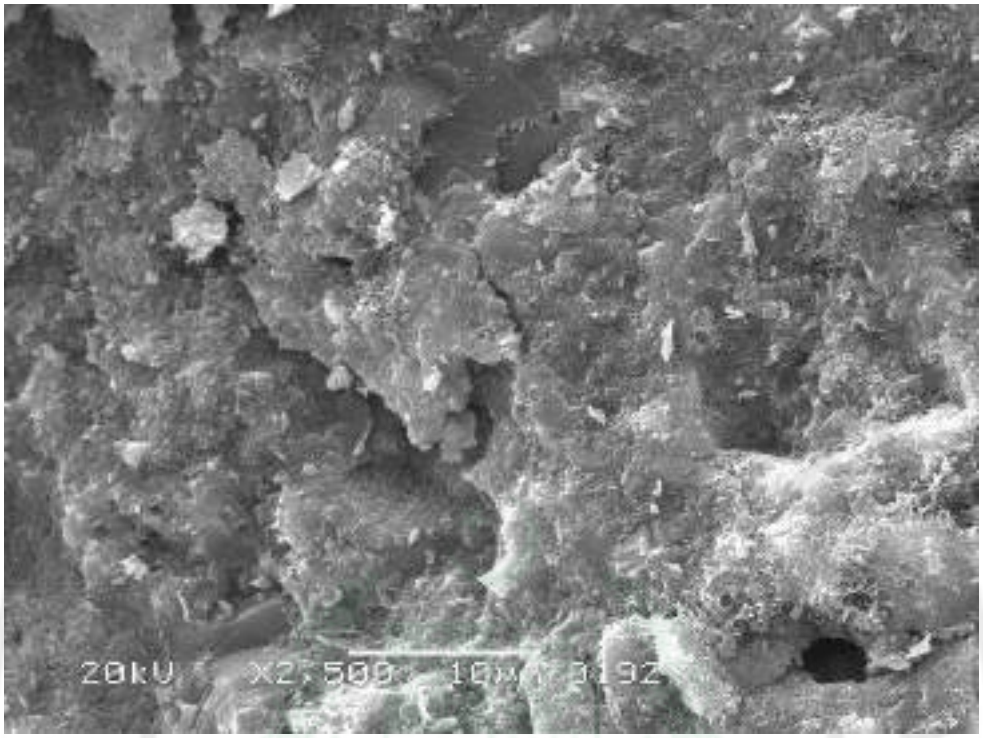
IMAGES

Photomicrographs of Thin section



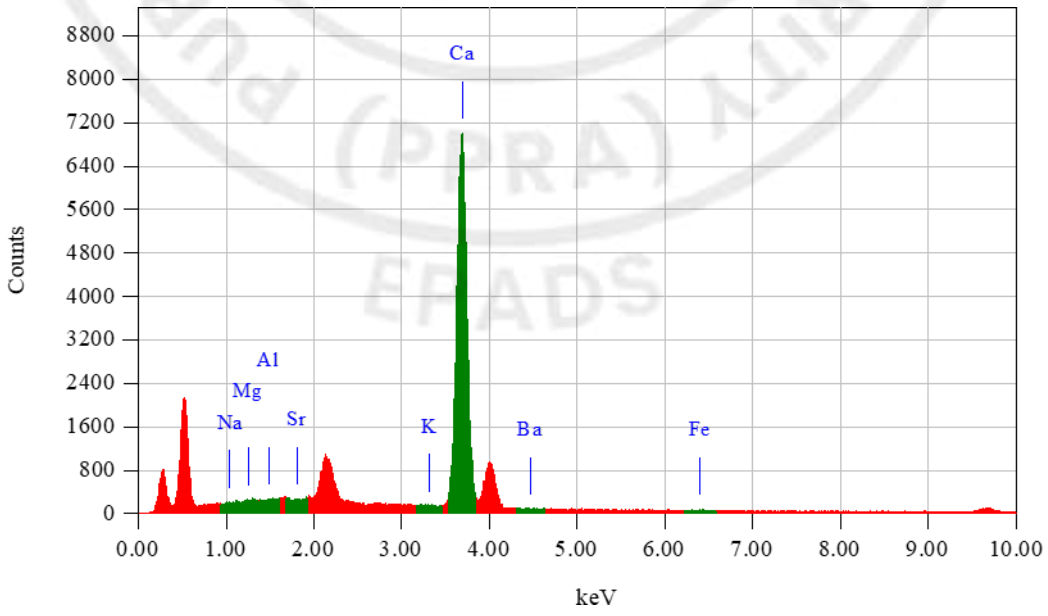
Magnification view of sample thin section at 4x magnification.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5426

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.11						
Na K	1.041	0.28	1.27	0.35	Na2O	0.38	0.17	0.1835
Mg K	1.253	0.21	1.16	0.49	MgO	0.35	0.12	0.1268
Al K	1.486	0.16	1.14	0.16	Al2O3	0.29	0.08	0.1158
K K	3.312	1.04	0.65	0.76	K2O	1.25	0.36	1.5901

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.71 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

10. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Plank-01 Unloading	Velosi-J

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

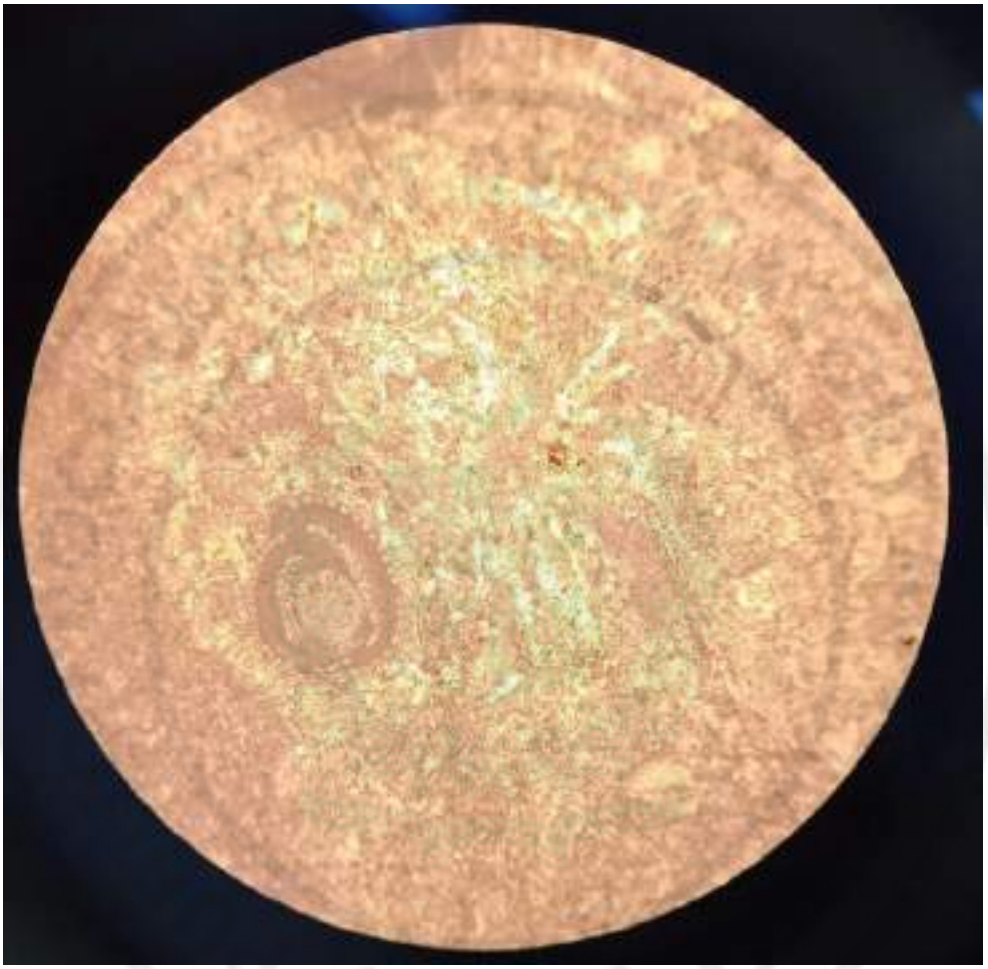
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

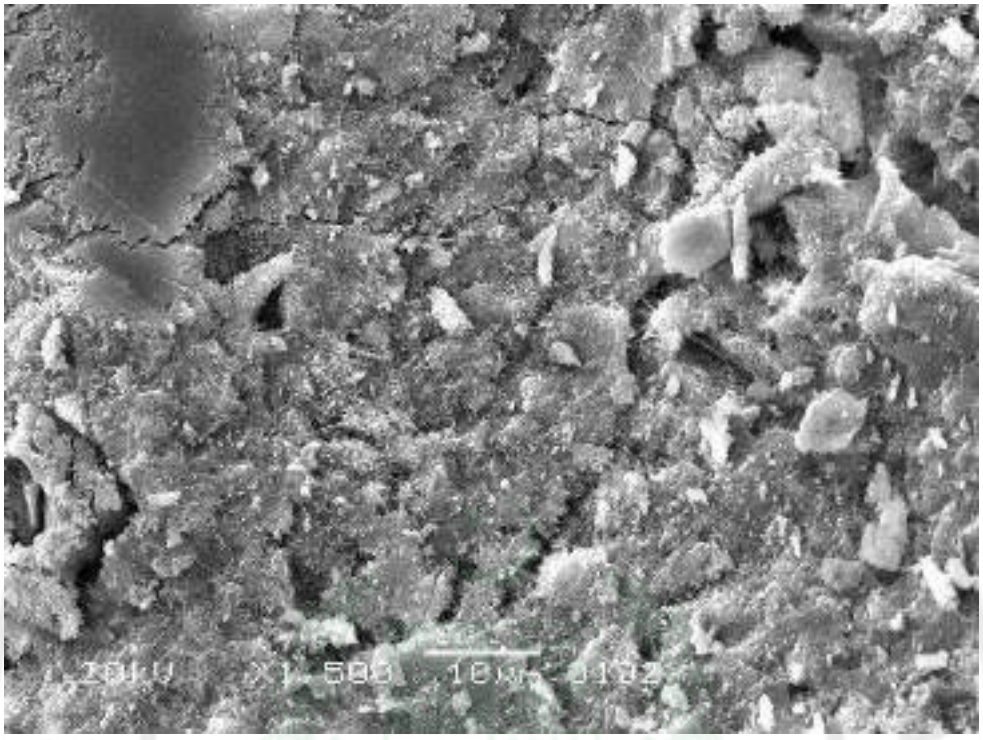
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

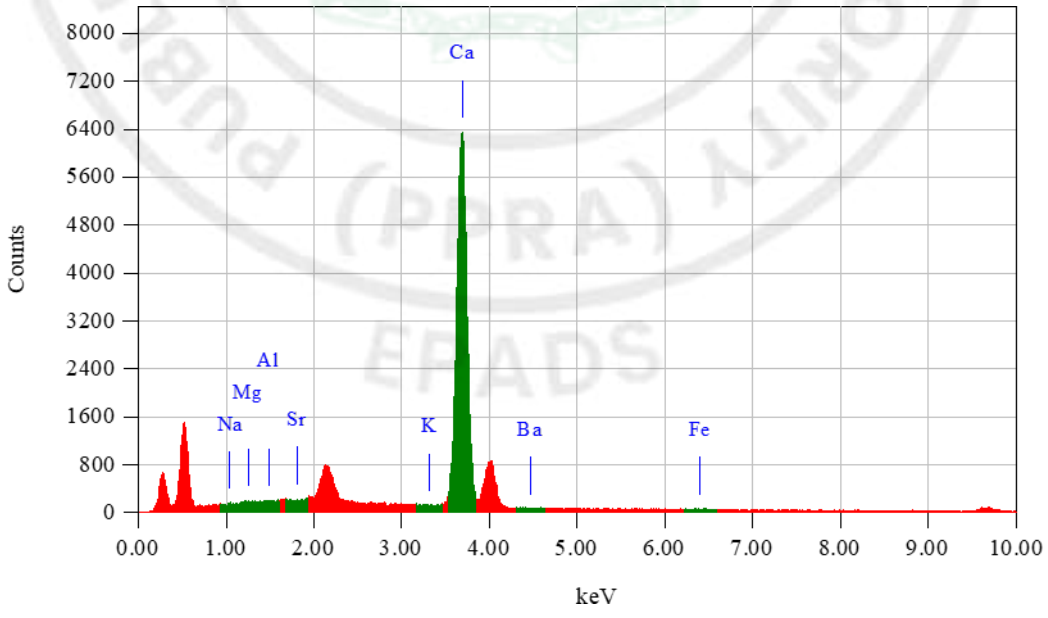


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5128

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.18						
Na K*	1.041	0.38	1.14	0.48	Na2O	0.52	0.23	0.2536
Mg K	1.253	0.02	1.05	0.04	MgO	0.03	0.01	0.0107
Al K	1.486	0.14	1.03	0.14	Al2O3	0.25	0.07	0.1011
K K	3.312	1.03	0.58	0.75	K2O	1.25	0.36	1.5899

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.47 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

11. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Bridge-01 Plank, Core-01	Velosi-K

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

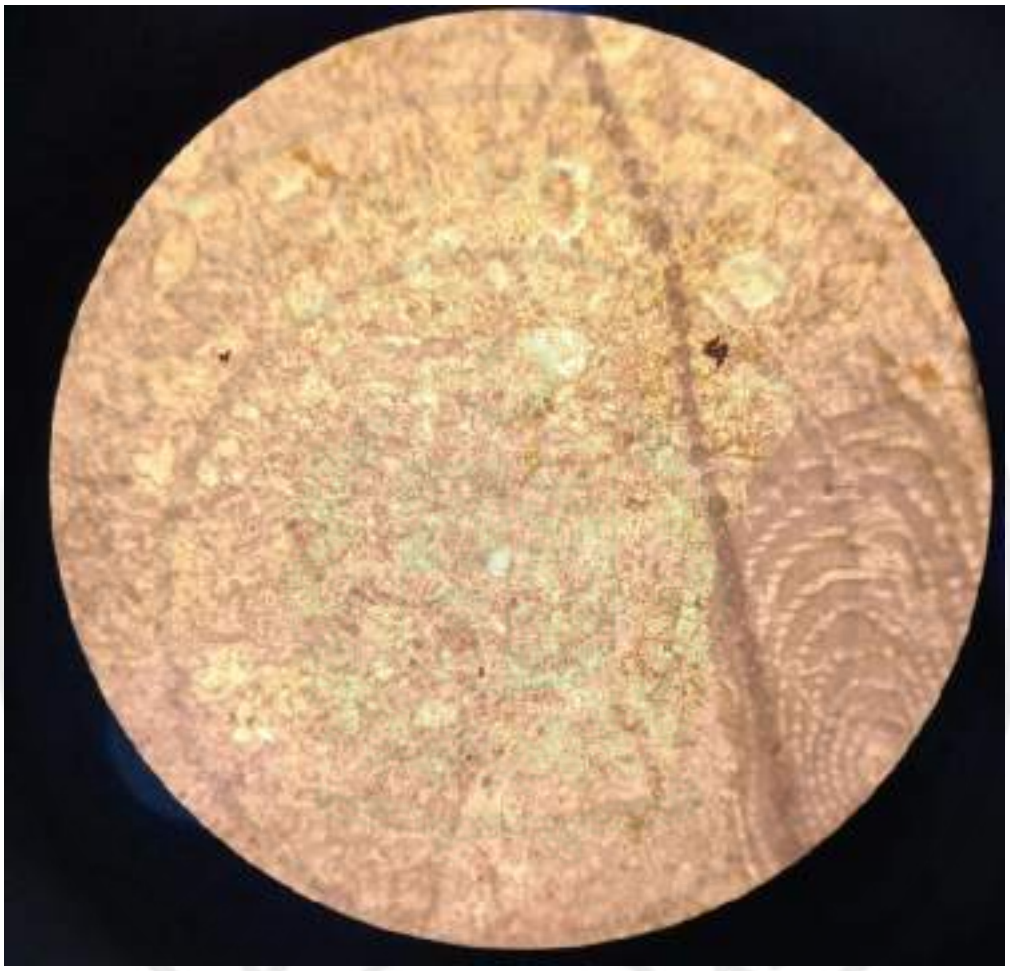
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

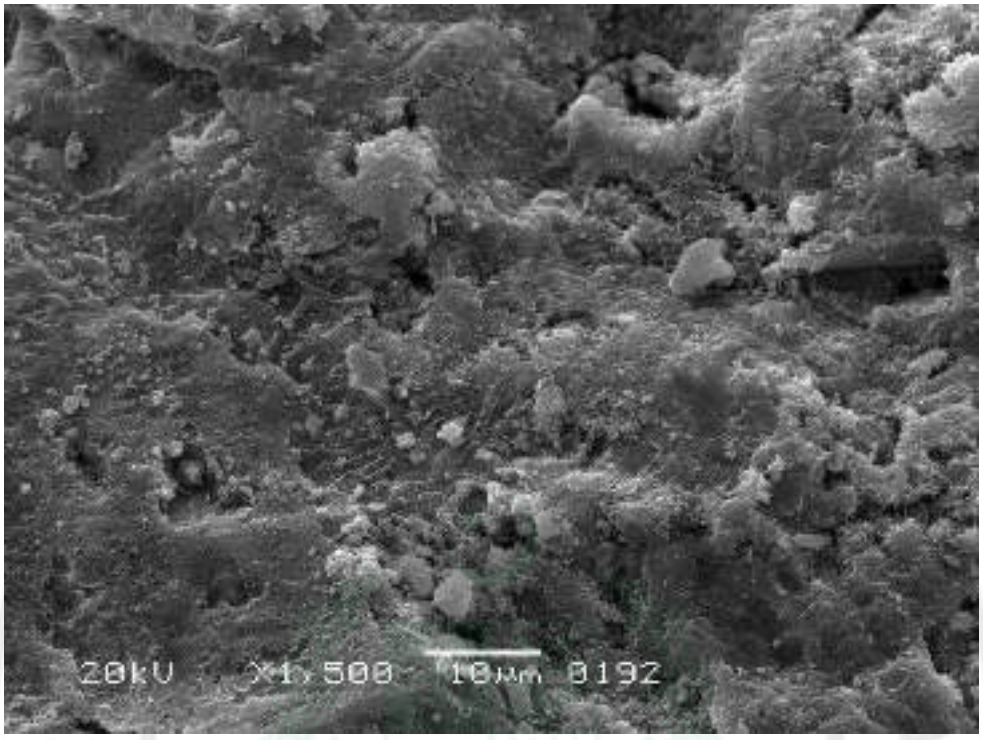
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

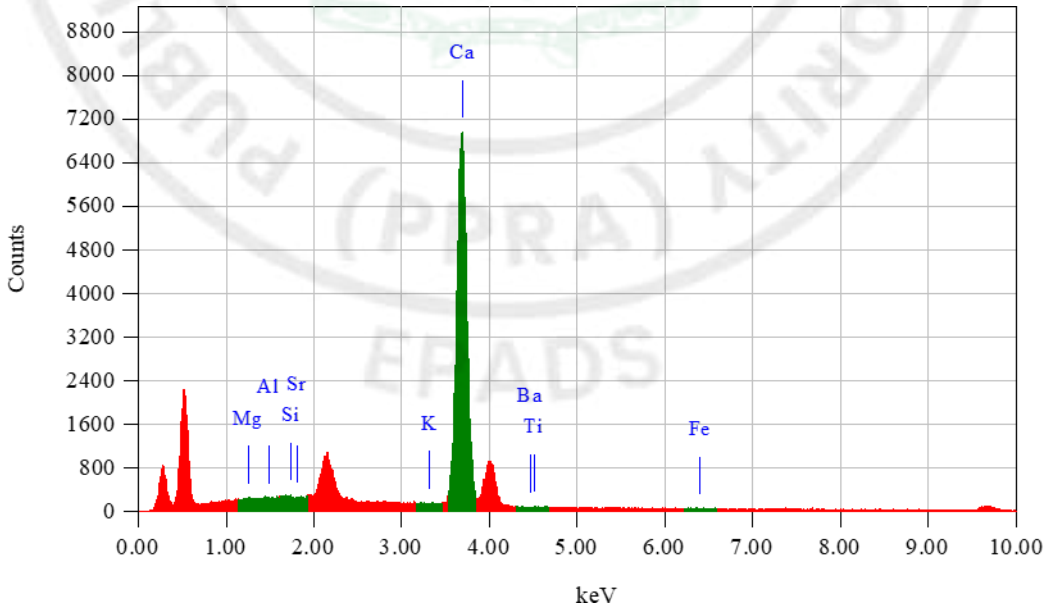


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5422

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.44						
Mg K	1.253	0.38	1.17	0.89	MgO	0.64	0.21	0.2353
Al K	1.486	0.11	1.15	0.12	Al2O3	0.21	0.06	0.0858
Si K*	1.739	0.19	1.47	0.38	SiO2	0.40	0.09	0.1786
K K	3.312	0.97	0.65	0.70	K2O	1.16	0.33	1.4898
Ca K	3.690	68.75	1.00	97.13	CaO	96.20	23.16	96.7881

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.81 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

12. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Bridge-02, Plank-01	Velosi-L

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

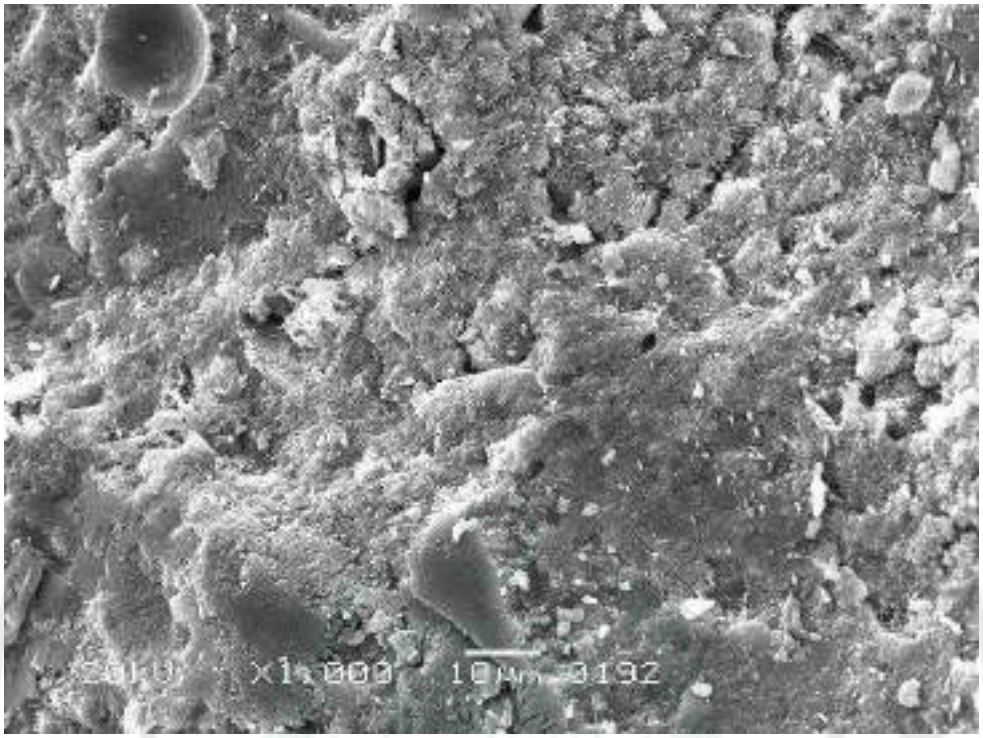
Binder

Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

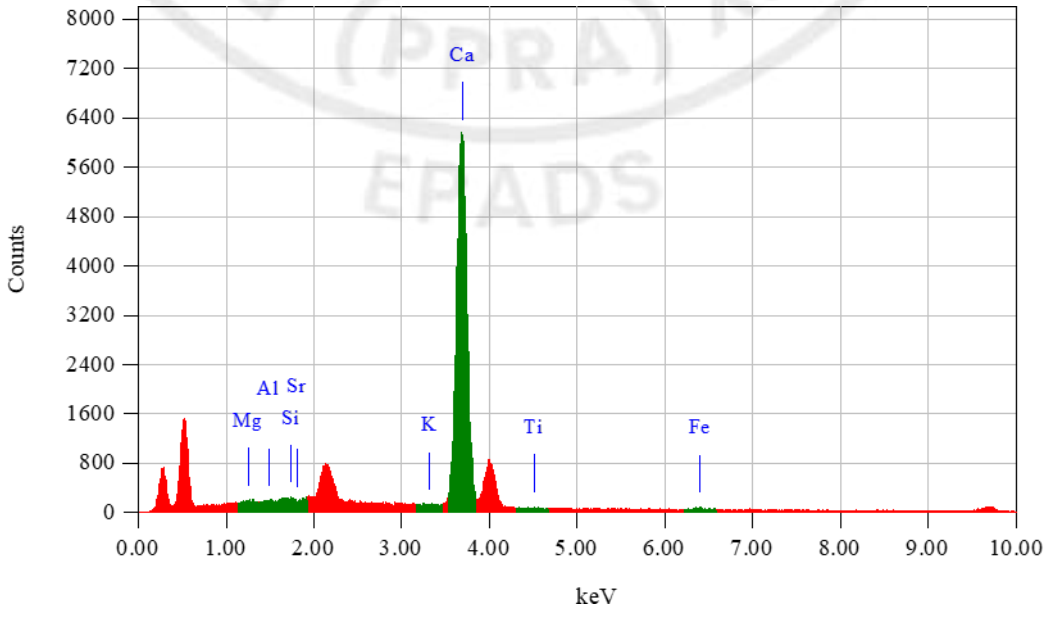
Photomicrographs of Thin section

Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5354

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		28.29						
Mg K	1.253	0.24	1.13	0.61	MgO	0.43	0.14	0.1561
Al K	1.486	0.19	1.12	0.19	Al2O3	0.33	0.09	0.1326
Si K	1.739	0.19	1.42	0.39	SiO2	0.41	0.09	0.1807
K K	3.312	1.02	0.62	0.74	K2O	1.22	0.35	1.5631
Ca K	3.690	67.86	0.96	96.51	CaO	94.93	22.98	95.8070

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.51 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

13. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Bridge-01, Transit-02, Core-02	Velosi-M

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

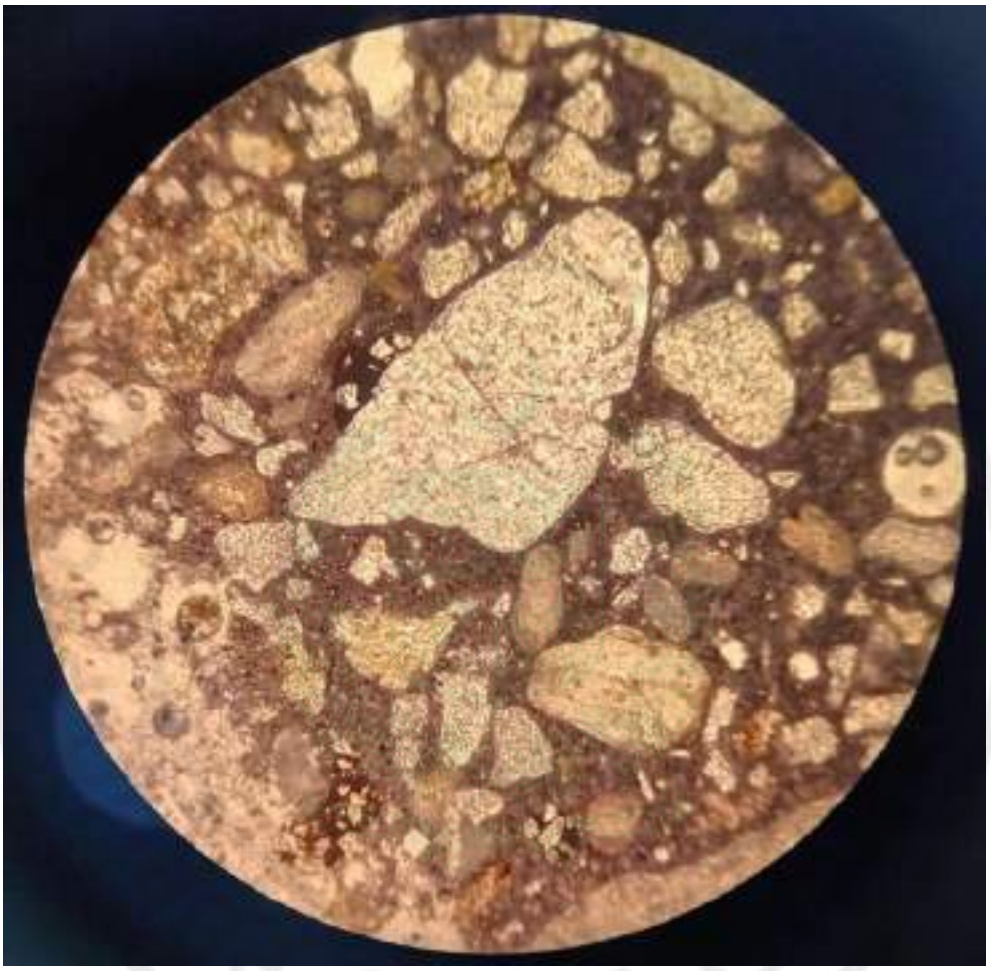
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

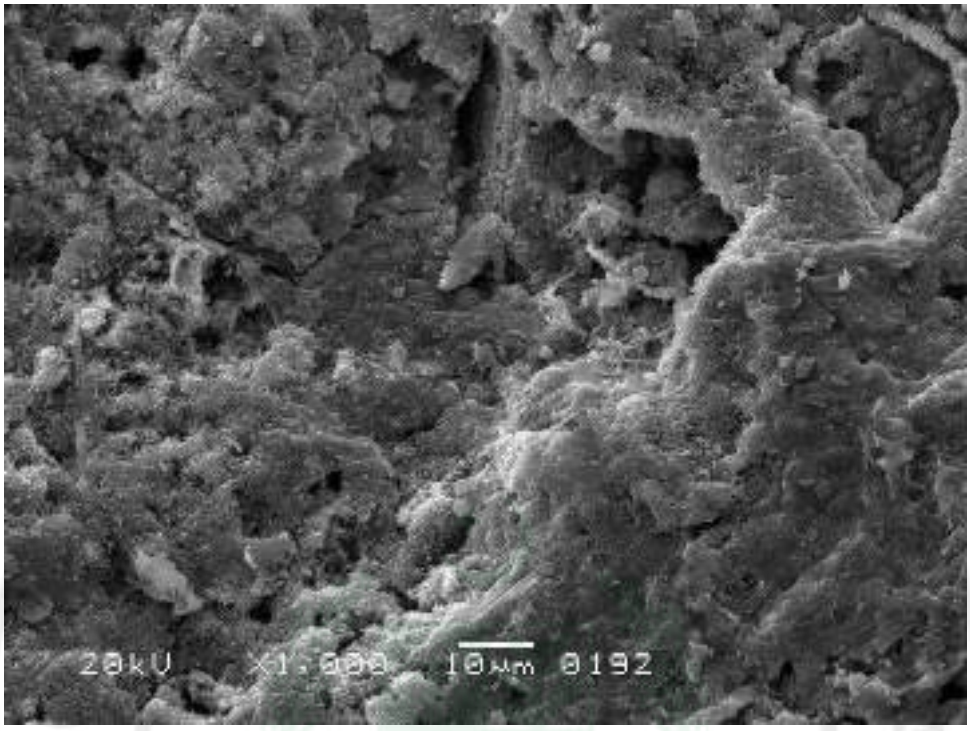
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

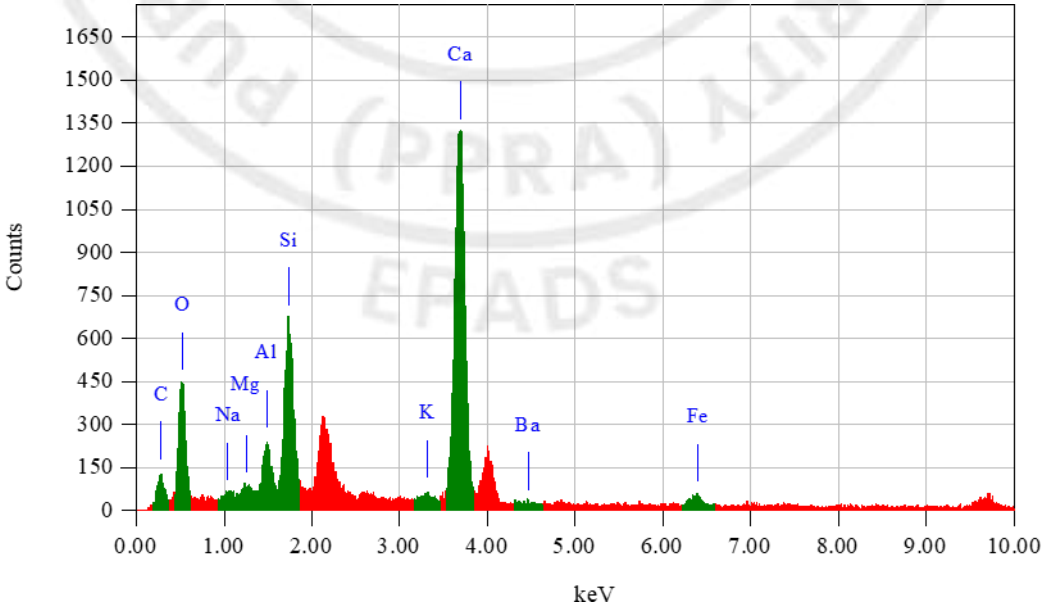


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.4479

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
C K	0.277	13.79	0.31	44.47	C	13.79	0.00	5.8581
O		30.67						
Na K*	1.041	0.71	0.51	0.59	Na2O	0.95	0.38	0.7092
Mg K*	1.253	0.80	0.48	1.29	MgO	1.34	0.42	0.7433
Al K	1.486	3.44	0.48	2.46	Al2O3	6.47	1.59	3.8459
Si K	1.739	10.01	0.53	13.80	SiO2	21.41	4.46	13.2208

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.38%.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

14. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Bridge-01, Transit-01	Velosi-N

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

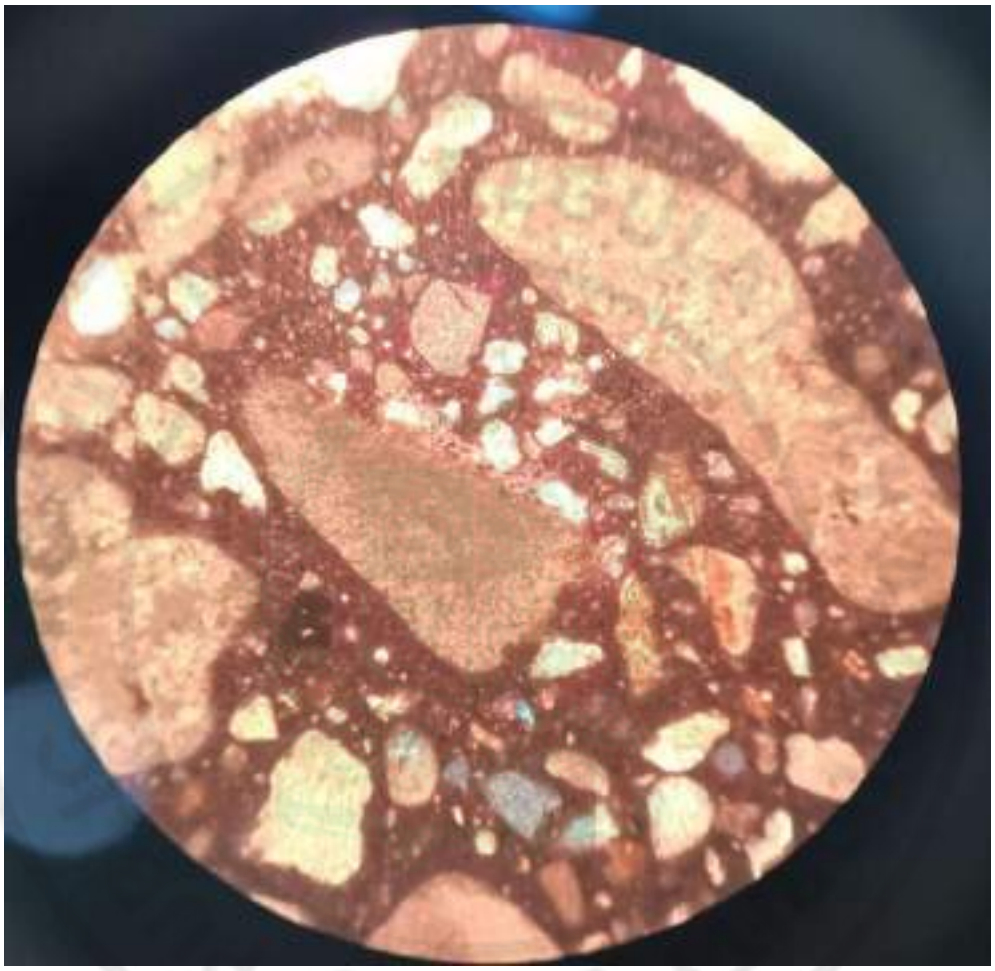
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

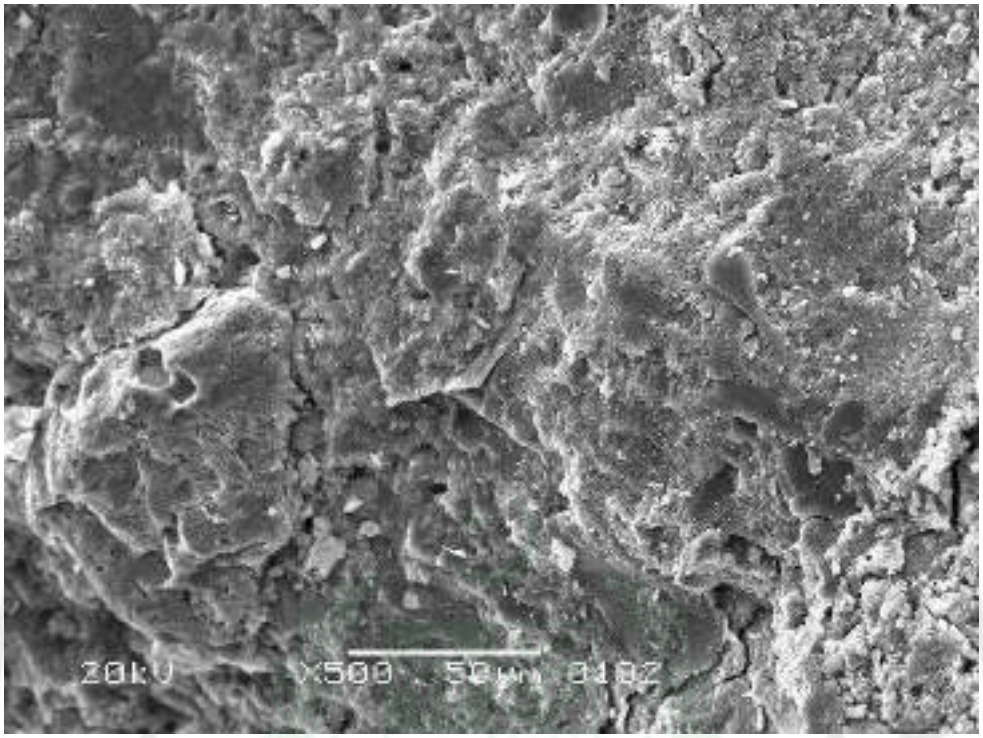
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

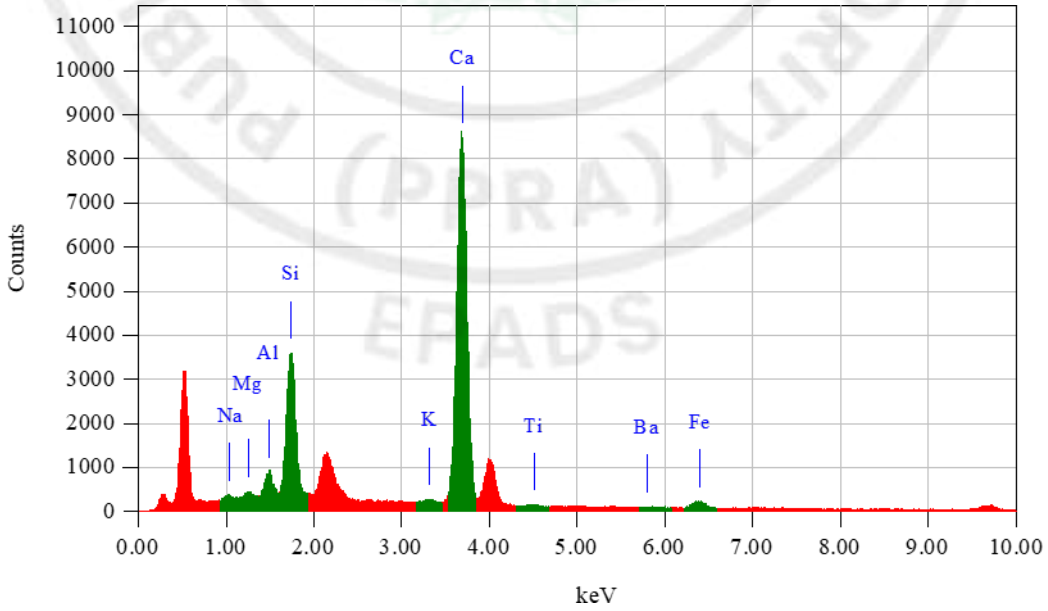


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.4872

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		34.87						
Na K	1.041	0.49	0.83	0.63	Na2O	0.65	0.23	0.4182
Mg K	1.253	0.72	0.77	1.76	MgO	1.19	0.33	0.5693
Al K	1.486	2.47	0.77	2.71	Al2O3	4.66	1.01	2.4013
Si K	1.739	11.13	1.02	23.50	SiO2	23.82	4.37	12.9896
K K	3.312	1.01	0.49	0.76	K2O	1.21	0.28	1.7328
Ca K	3.690	45.34	0.71	67.08	CaO	63.44	12.46	76.7822

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.77 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

15. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Bridge-02, Transit-02, Core-02	Velosi-O

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

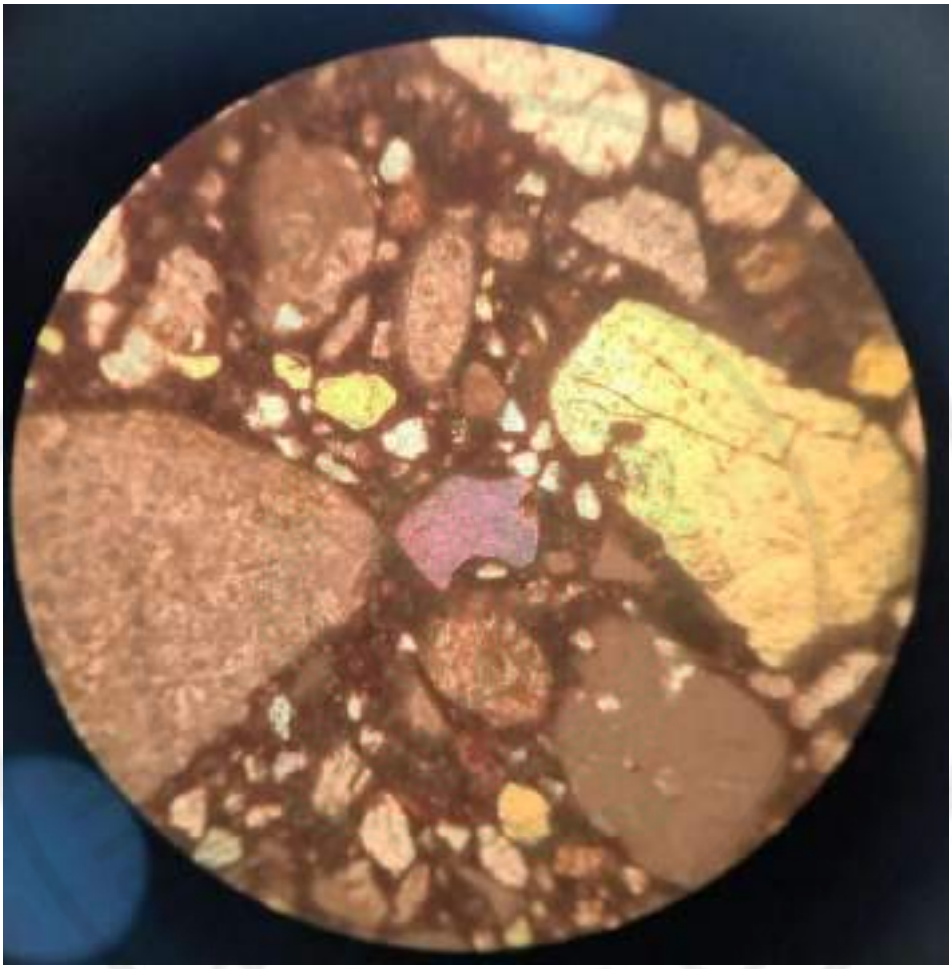
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

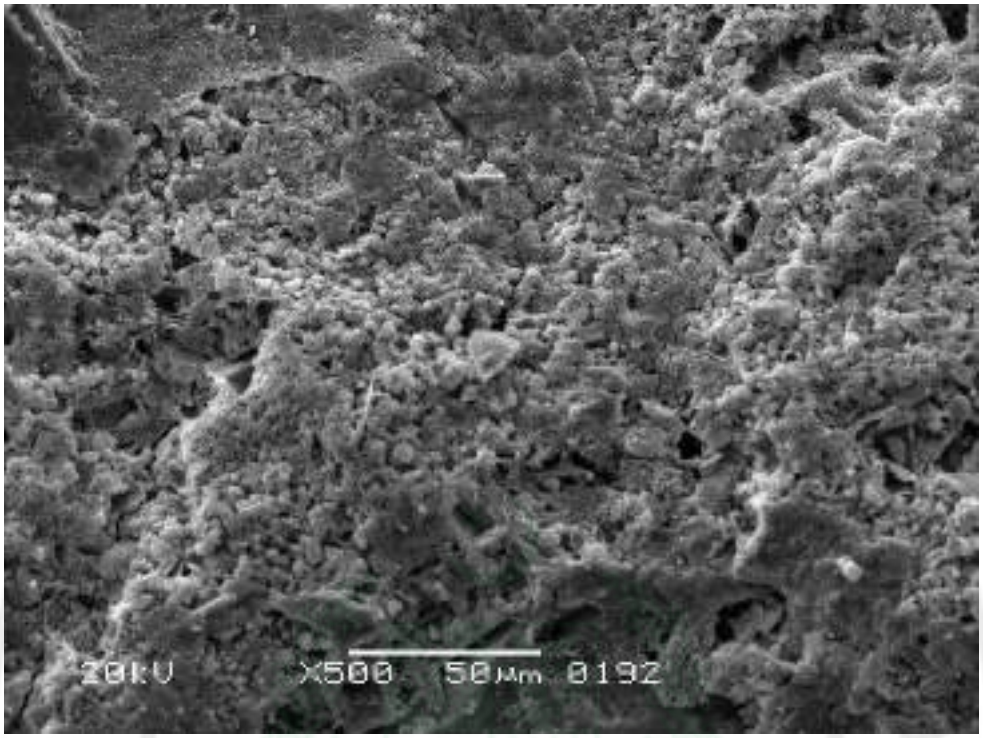
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

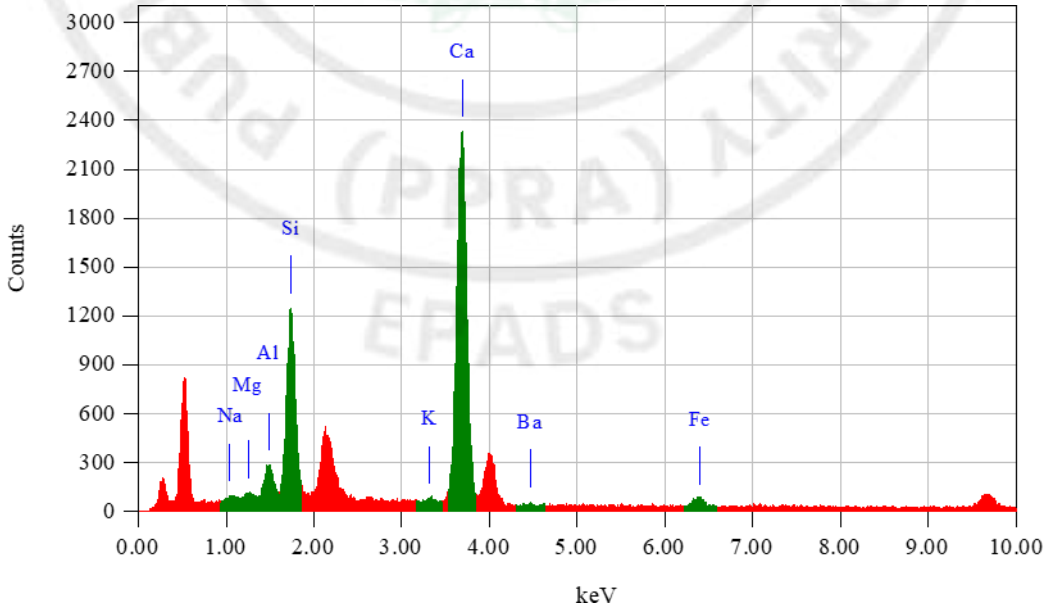


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.5268

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		36.01						
Na K	1.041	0.45	0.78	0.59	Na2O	0.61	0.21	0.4096
Mg K	1.253	0.68	0.72	1.68	MgO	1.13	0.30	0.5645
Al K	1.486	2.88	0.72	3.19	Al2O3	5.44	1.14	2.9281
Si K	1.739	13.22	0.79	28.13	SiO2	28.28	5.02	16.0150

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.27 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

16. SAMPLE DETAILS

Samples Received	
Sample Reference	**Lab ID**
Bridge-02, Transit-01	Velosi-P

PETROGRAPHIC DESCRIPTIONS

Aggregate detail

Coarse Aggregate details	
Aggregate Type	Crush stone of Fossiliferous limestone
Major Component	Limestone
Minor Component	-
Size range	5-15 mm
Grading	Well graded
Shape	Sub angular to angular

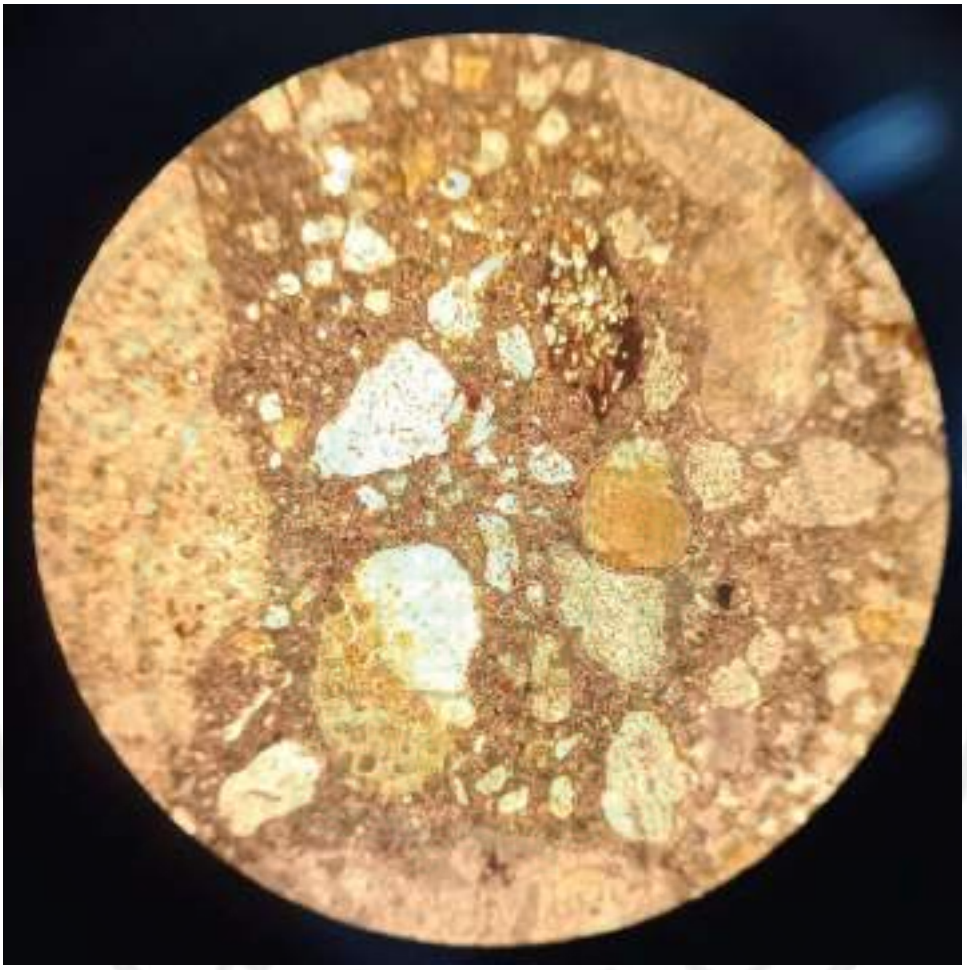
Fine Aggregate details	
Aggregate Type	Quartz rich sand
Major Component	Quartz
Size range	Less than 1-5 mm
Grading	Well graded
Shape	Rounded to sub rounded

Binder

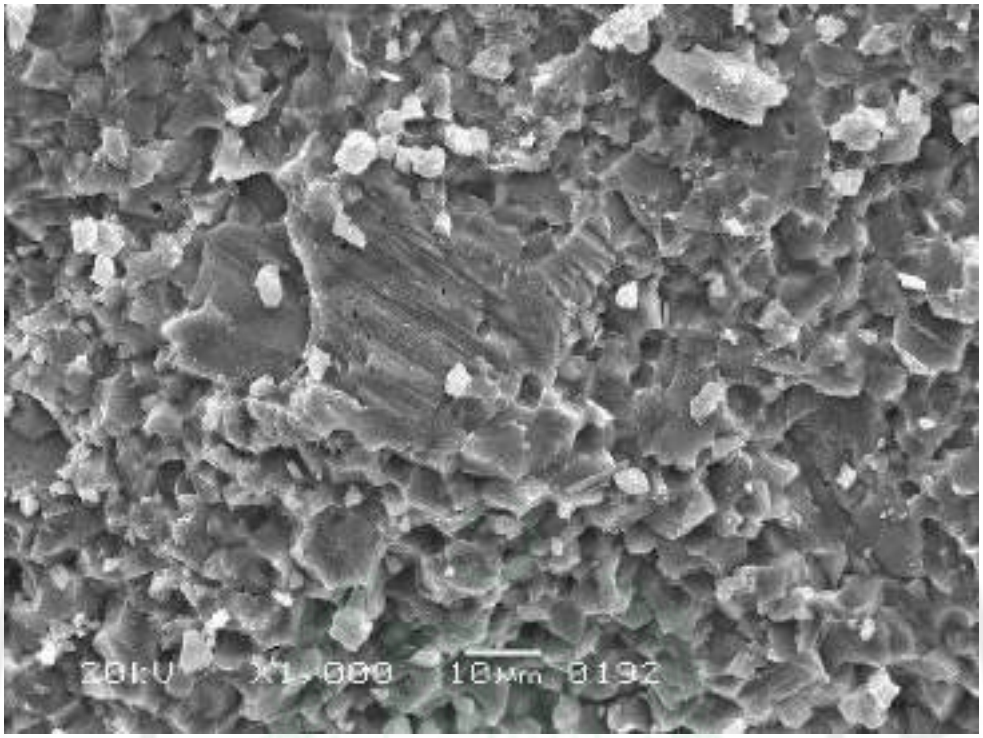
Un carbonated Binder	
Cement Type	Ordinary Portland Cement

IMAGES

Photomicrographs of Thin section

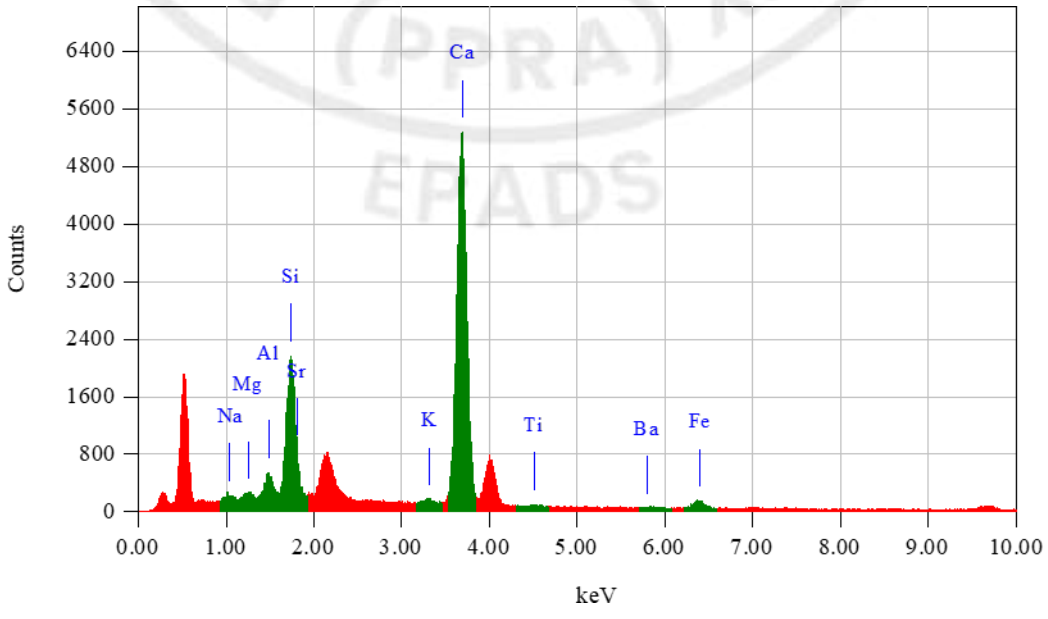


Magnification view of sample thin section at 4x magnification.



General view of sample showing overall structure by using SEM image.

EDS Result



ZAF Method Standardless Quantitative Analysis(Oxide)

Fitting Coefficient : 0.4985

Total Oxide : 24.0

Element	(keV)	mass%	Error%	Mol%	Compound	mass%	Cation	K
O		34.57						
Na K	1.041	0.65	0.85	0.84	Na2O	0.88	0.31	0.5521
Mg K	1.253	0.70	0.79	1.70	MgO	1.16	0.32	0.5440
Al K	1.486	2.26	0.79	2.48	Al2O3	4.27	0.93	2.1712
Si K	1.739	10.68	1.04	22.46	SiO2	22.84	4.22	12.3393
K K	3.312	1.08	0.50	0.82	K2O	1.30	0.31	1.8523
Ca K	3.690	46.02	0.72	67.85	CaO	64.39	12.75	77.3541

Investigating the composition and quality of concrete

The successful construction of strong and durable structures is dependent on an appropriate quality of concrete built into the mix design with respect to strength and durability aspects, materials of concrete used, handling the execution phases and the workmanship.

The following main items are briefly discussed:

1. Properties of hardened concrete

The properties of hardened concrete dependent of many factors but here we described the prominent factors which are performed in the laboratory by physical testing and by further complementing petrographic analysis.

- **Strength**

Strength is among the main properties of concrete durability. The compressive strength of concrete is tested by using ASTM C42.

- **Cement Content**

Cement content determined by chemical analysis is about 16.70 %.

2. Presence of deleterious aggregate

No deleterious and harmful material in the composition of concrete was noted.

3. Degree of cement hydration

The degree of hydration determined to be low to moderate as noted down through optical micro scope observation.

4. Alkali silica reactivity

ASR reaction is not observed in thin section.

5. Supplementary cementitious material

There is not found any supplementary siliceous material such as fly ash or silica fumes.

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ANNEXURE – 4: CARBONATION DEPTH TEST ON EXTRACTED CORES TEST

PUBLIC PROCUREMENT REGULATORY AUTHORITY (PPRA) EPADS

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
1	**PLANK - 1**	9.47	20.3	0.00	20.32	
2	**PLANK - 2**	9.47	33.0	0.00	33.02	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
3	**PLANK - 3**	9.47	15.2	0.00	15.24	
4	**PLANK - 4**	9.47	33.0	0.00	33.02	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
5	**PLANK - 5**	9.47	15.2	1.27	13.97	
6	**TRANSOM - 1**	9.47	40.6	0.00	15.24	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
7	**TRANSOM - 2**	9.47	30.5	0.00	30.48	
8	**TRANSOM - 3**	9.47	20.3	0.00	20.32	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
9	**TRANSOM - 4**	9.47	20.3	0.00	20.32	
10	**TRANSOM - 5**	9.47	15.2	0.00	15.24	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
11	**TRANSOM - 6**	9.47	22.9	0.00	22.86	
12	**TRANSOM - 7**	9.47	35.6	0.00	10.16	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
13	**PILE HEAD - 1**	9.47	30.5	0.00	30.48	
14	**PILE HEAD - 2**	9.47	30.5	0.00	30.48	

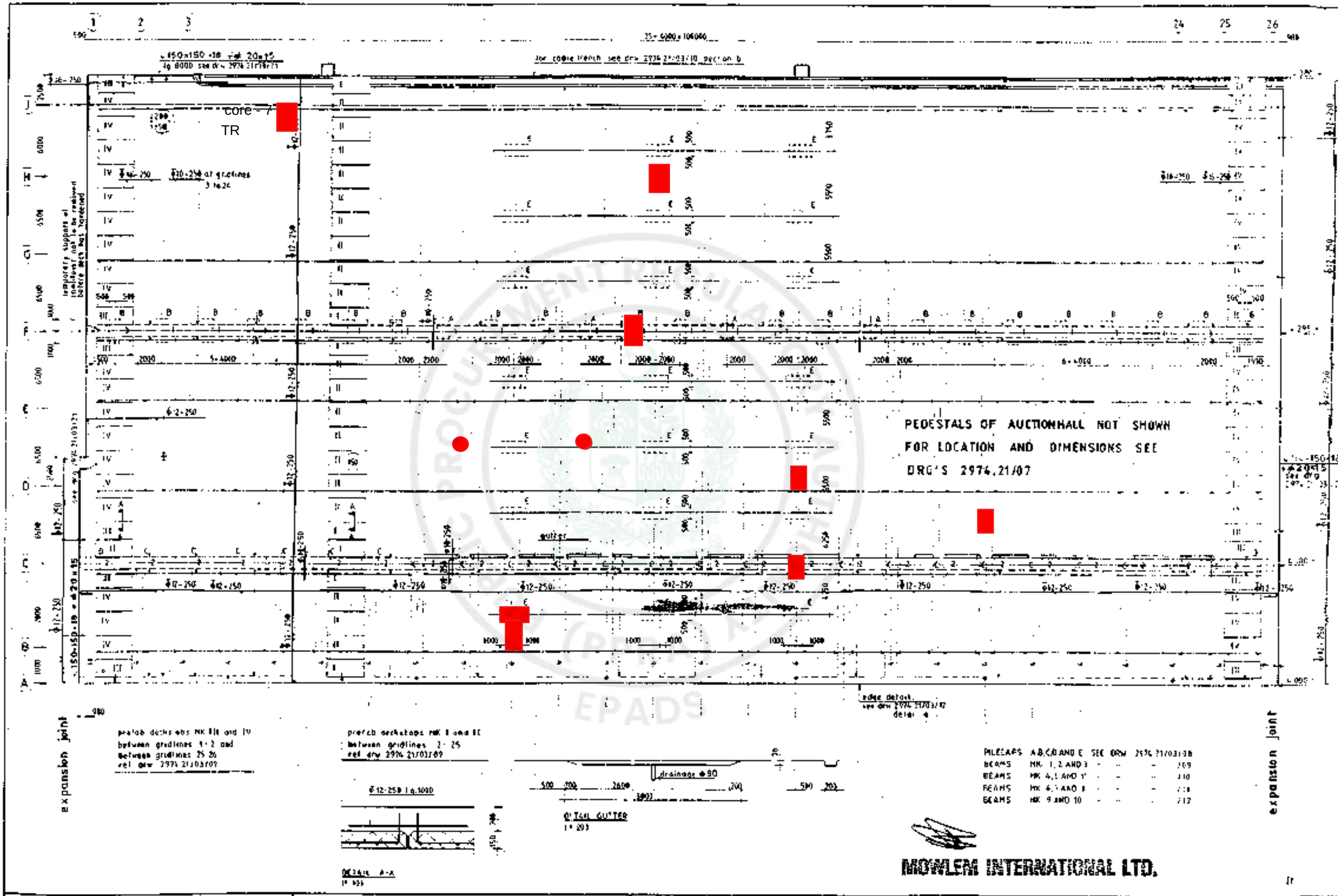
S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
UNLOADING JETTY						
15	**PILE HEAD - 4**	9.47	30.5	0.00	30.48	
16	**PILE HEAD - 5**	9.47	30.5	0.00	30.48	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
BRIDGE - 1						
17	**PLANK - 1**	9.47	15.2	0.00	15.24	
18	**PLANK - 2**	9.47	30.5	7.62	22.86	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
BRIDGE - 1						
19	**TRANSOM - 1**	9.47	30.5	0.00	30.48	
20	**TRANSOM - 2**	9.47	17.8	0.00	17.78	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
BRIDGE – 2						
21	**PLANK - 1**	9.47	20.3	0.00	20.32	
22	**PLANK - 2**	9.47	30.5	0.00	30.48	

S.NO	Specimen	Diameter (cm)	Length (cm)	Carbonated Depth (cm) (No Coloration)	Non-Carbonated Depth (cm) (Coloration)	Picture
BRIDGE – 2						
23	**TRANSOM - 1**	9.47	30.5	0.00	30.48	
24	**TRANSOM - 2**	9.47	30.5	0.00	30.48	


core - 7
TR
PEDESTALS OF AUCTIONHALL NOT SHOWN
FOR LOCATION AND DIMENSIONS SEE
DRG'S 2974.21/07
expansion joint
expansion joint
DETAIL A-A
DETAIL GUTTER
drainage Φ90
MOWLEM INTERNATIONAL LTD.
Islamic Republic of Pakistan
KORANGI FISHERIES HARBOUR AUTHORITY
nedeco
NETHERLANDS ENGINEERING CONSULTANTS
Techno - Consult
CONSULTING ENGINEERS
KARACHI
DESIGNED : AT
DRAWN : BMJ
CHECKED :
APPROVED :
KORANGI FISHERIES HARBOUR PROJECT
JETTIES
UNLOADING JETTY
DRG Nº
2974 21/03/08
SCALE

PEDESTALS OF AUCTION HALL NOT SHOWN

FOR LOCATION AND DIMENSIONS SEE

DRGS 2974.21/07

FOR REINFORCEMENT SEE DECK BETWEEN GRIDLINE 1 AND 26

expansion joint

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KARACHI

DESIGNED : A.I	KORANGI FISHERIES HARBOUR PROJECT	DRG NO
DRAWN : B.W.J	JETTIES	2974.21/03/07
CHECKED :	UNLOADING JETTY DECK BETWEEN GRIDLINE	SCALE:
APPROVED:		

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APPROACH BRIDGE AT GRIDLINES 1-9 AND AT GRIDLINES 50-52

BEAM MARK 1 2 No

BEAM MARK 2 10 No

BEAM MARK 3 2 No

MARK III 44 No

FINISH : REMOVE MORTAR SKIN BY SPRAYING OR BRUSHING . MARK I 88 No

section a

section b

section c

section d

section e

section f

section g

section h

section j

TRANSITION SLAB 16 no MARK II

gridline L,N and P

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Techno-Consult CONSULTING ENGINEERS KARACHI PAKISTAN

DESIGNED : AT
DRAWN : BWJ
CHECKED :
APPROVED :

KORANGI FISHERIES HARBOUR PROJECT
JETTIES
UNLOADING JETTY
APPROACH BRIDGE AT GRIDLINES

ORG NO
2974.21/03/13

SCALE :

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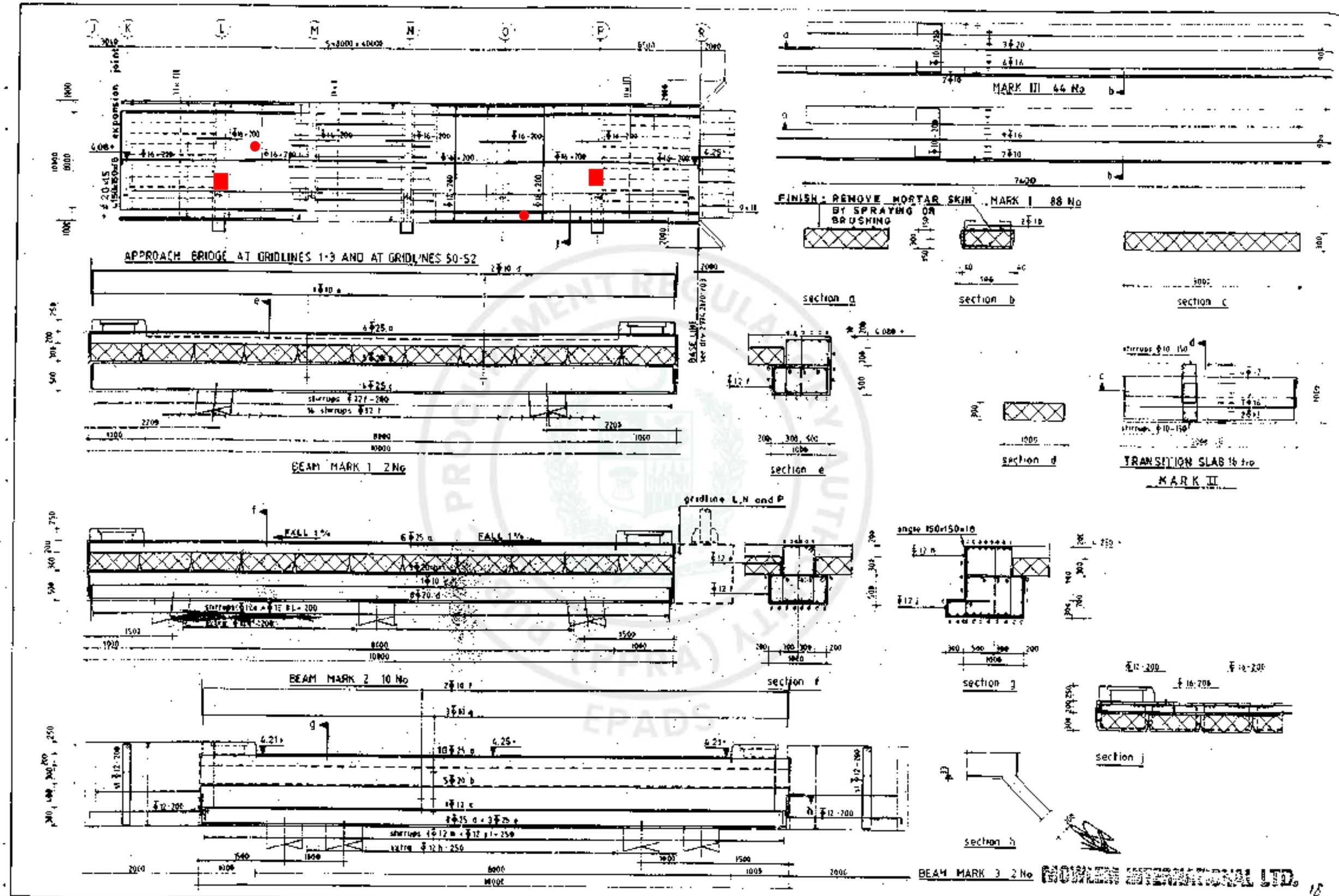

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DRAWN : BWJ	JETTIES	2974.21/03/13
CHECKED :	UNLOADING JETTY	SCALE:
APPROVED:	APPROACH BRIDGE AT GRIDLINES	

ANNEXURE – 5: DELAMINATION SURVEY OF STRUCTURAL ELEMENTS OF JETTY AND ACCESS BRIDGES TEST

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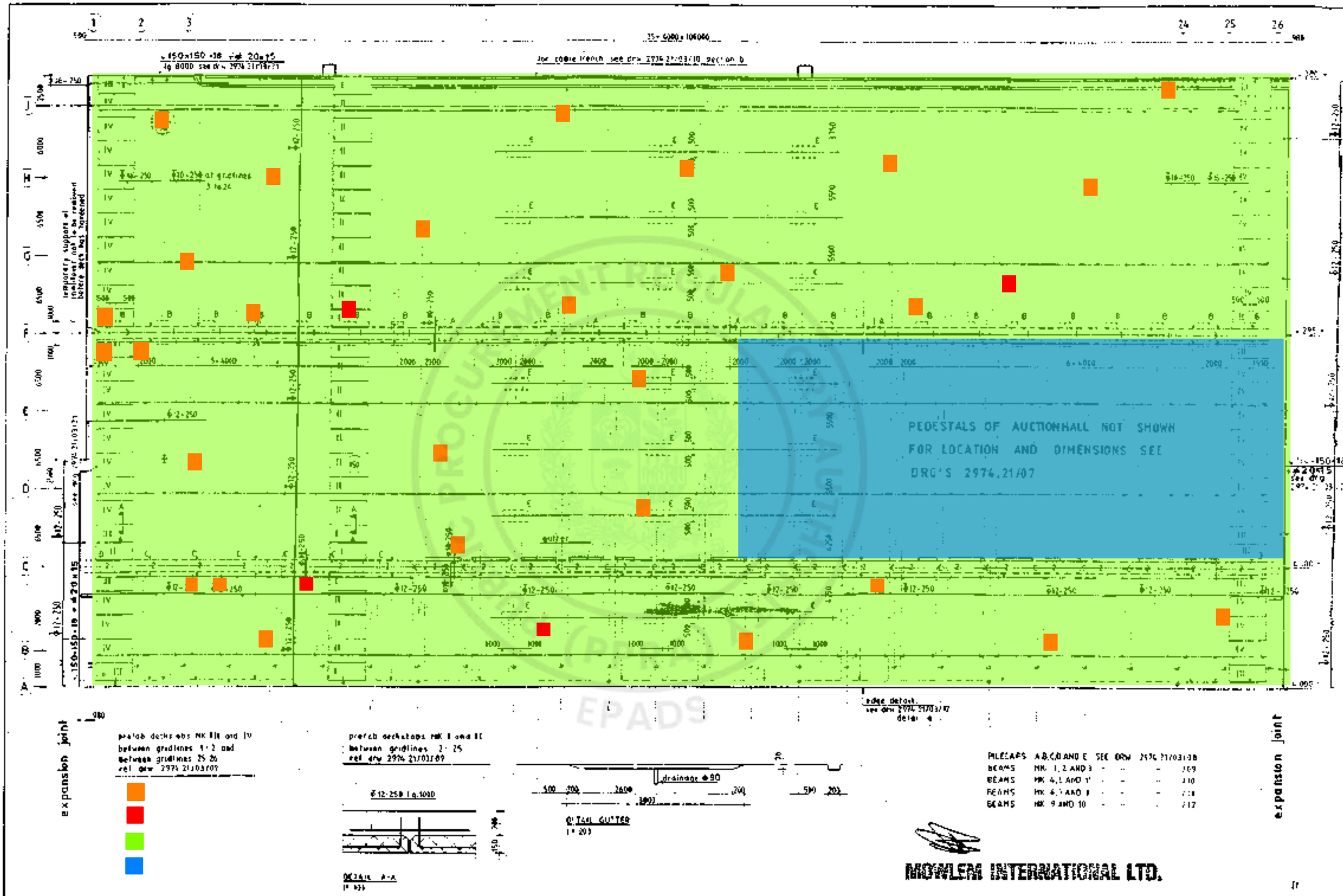
PEDESTALS OF AUCTIONHALL NOT SHOWN
FOR LOCATION AND DIMENSIONS SEE
DRG'S 2974.21/07
expansion joint
expansion joint
DETAIL A-A
DETAIL GUTTER
drainage Ø 90
MOWLEM INTERNATIONAL LTD.
Islamic Republic of Pakistan
KORANGI FISHERIES HARBOUR AUTHORITY
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NETHERLANDS ENGINEERING CONSULTANTS
Techno - Consult
CONSULTING ENGINEERS
KARACHI
DESIGNED : AT
DRAWN : BMJ
CHECKED :
APPROVED :
KORANGI FISHERIES HARBOUR PROJECT
JETTIES
UNLOADING JETTY
DRG Nº
2974 21/03/08
SCALE

PEDESTALS OF AUCTION HALL NOT SHOWN

FOR LOCATION AND DIMENSIONS SEE

DRG'S 2974 / 07

FOR REINFORCEMENT SEE DECK BETWEEN GRIDLINE 1 AND 26

expansion joint

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DRAWN : B.W.J	JETTIES	2974.21/03/07
CHECKED :	UNLOADING JETTY	SCALE:
APPROVED:	DECK BETWEEN GRIDLINE	

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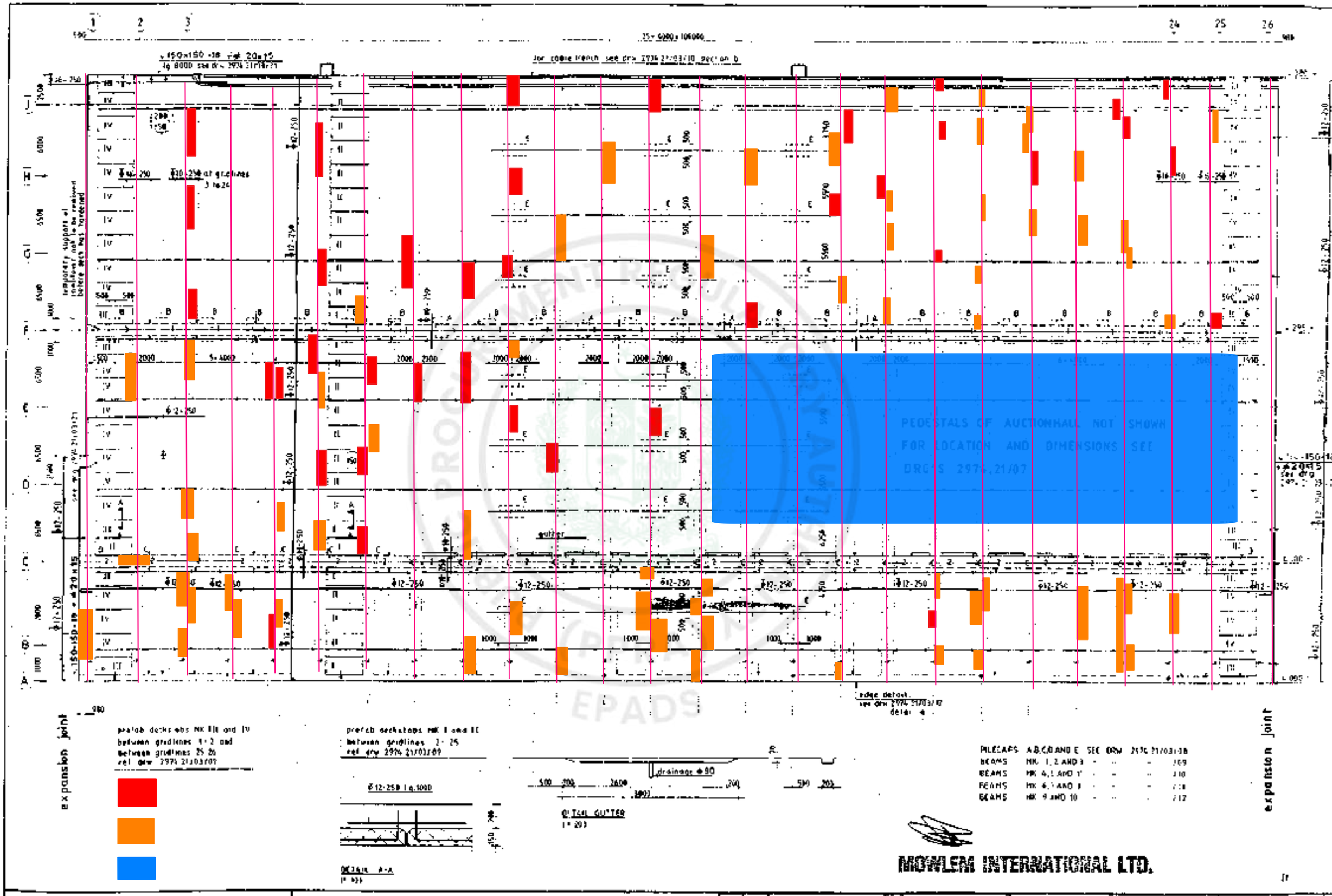

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DRAWN : BMJ	JETTIES	2974.21/03/08
CHECKED :	UNLOADING JETTY	SCALE
APPROVED :	DECK DETAILS ENGINE	

PEDESTALS OF AUCTION HALL NOT SHOWN
FOR LOCATION AND DIMENSIONS SEE
DRG'S 2974.21/07

FOR REINFORCEMENT SEE DECK BETWEEN GRIDLINE 1 AND 26

expansion joint

with approach bridge

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DRAWN : B.W.J	JETTIES
CHECKED :	UNLOADING JETTY DECK BETWEEN GRIDLINE
APPROVED:	

DRG NO 2974.21/03/07

SCALE:

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APPROACH BRIDGE AT GRIDLINES 1-3 AND AT GRIDLINES 50-52

BEAM MARK 1 2 No

BEAM MARK 2 10 No

BEAM MARK 3 2 No

MARK III 44 No

FINISH : REMOVE MORTAR SKIN BY SPRAYING OR BRUSHING ..MARK I 88 No

section a

section b

section c

section d

section e

section f

section g

section h

section j

TRANSITION SLAB 16 no MARK II

gridline L,N and P

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DRAWN : BWJ
CHECKED :
APPROVED :

KORANGI FISHERIES HARBOUR PROJECT
JETTIES
UNLOADING JETTY
APPROACH BRIDGE AT GRIDLINES

DRG NO
2974.21/03/13

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APPROACH BRIDGE AT GRIDLINES 1-3 AND AT GRIDLINES 50-52

BEAM MARK 1 2 Nos

BEAM MARK 2 10 Nos

BEAM MARK 3 2 Nos

MARK III 44 Nos

FINISH: REMOVE MORTAR SKIN BY SPRAYING OR BRUSHING

MARK I 88 Nos

section a

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section d

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section f

section g

section h

section j

TRANSITION SLAB 1b fro MARK II

gridline L,N and P

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JETTIES
UNLOADING JETTY
APPROACH BRIDGE AT GRIDLINES

ORG NO
2974.21/03/13

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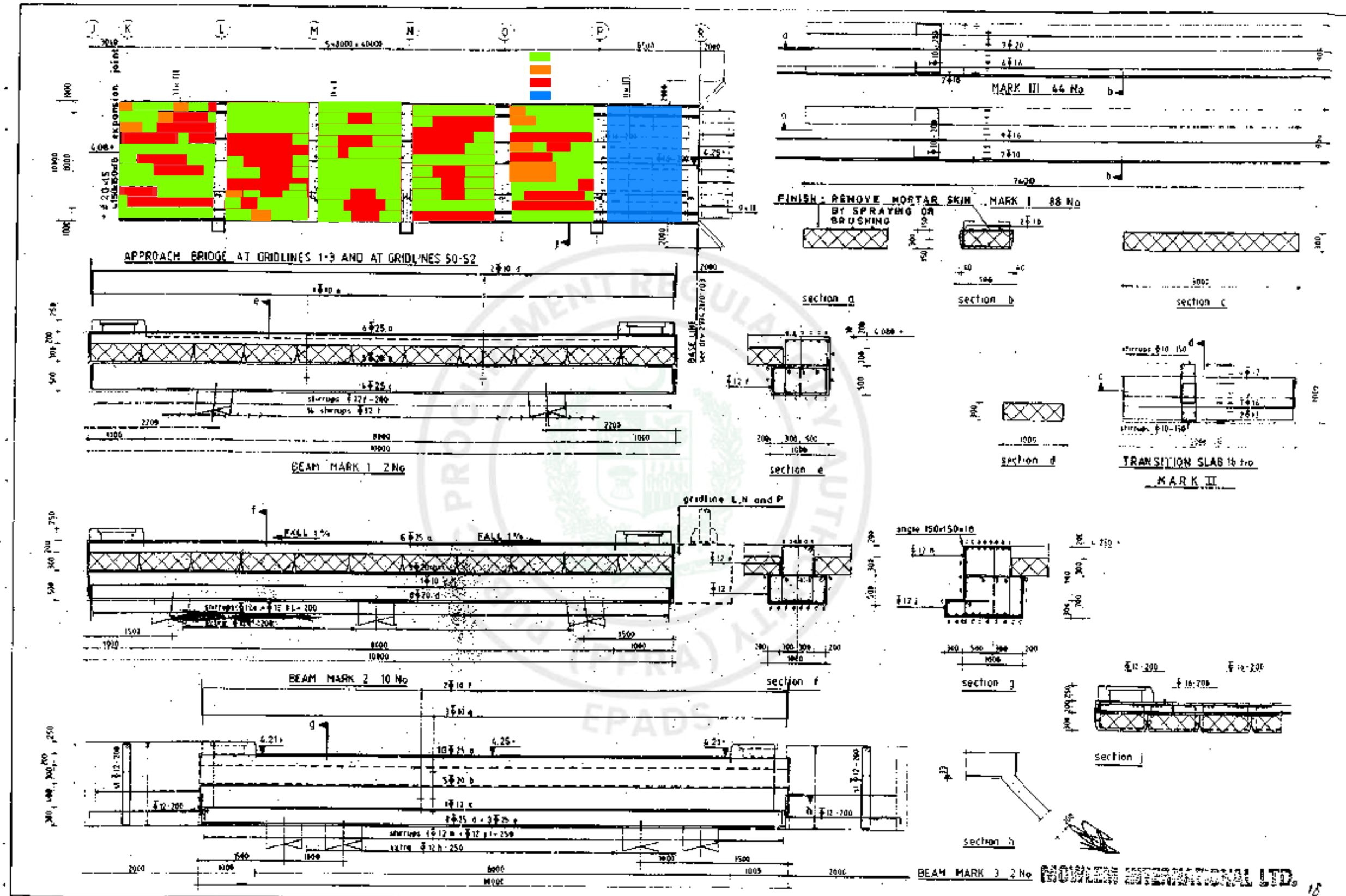

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PAKISTAN

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DRAWN : BWJ	JETTIES	2974.21/03/13
CHECKED :	UNLOADING JETTY	SCALE:
APPROVED:	APPROACH BRIDGE AT GRIDLINES	

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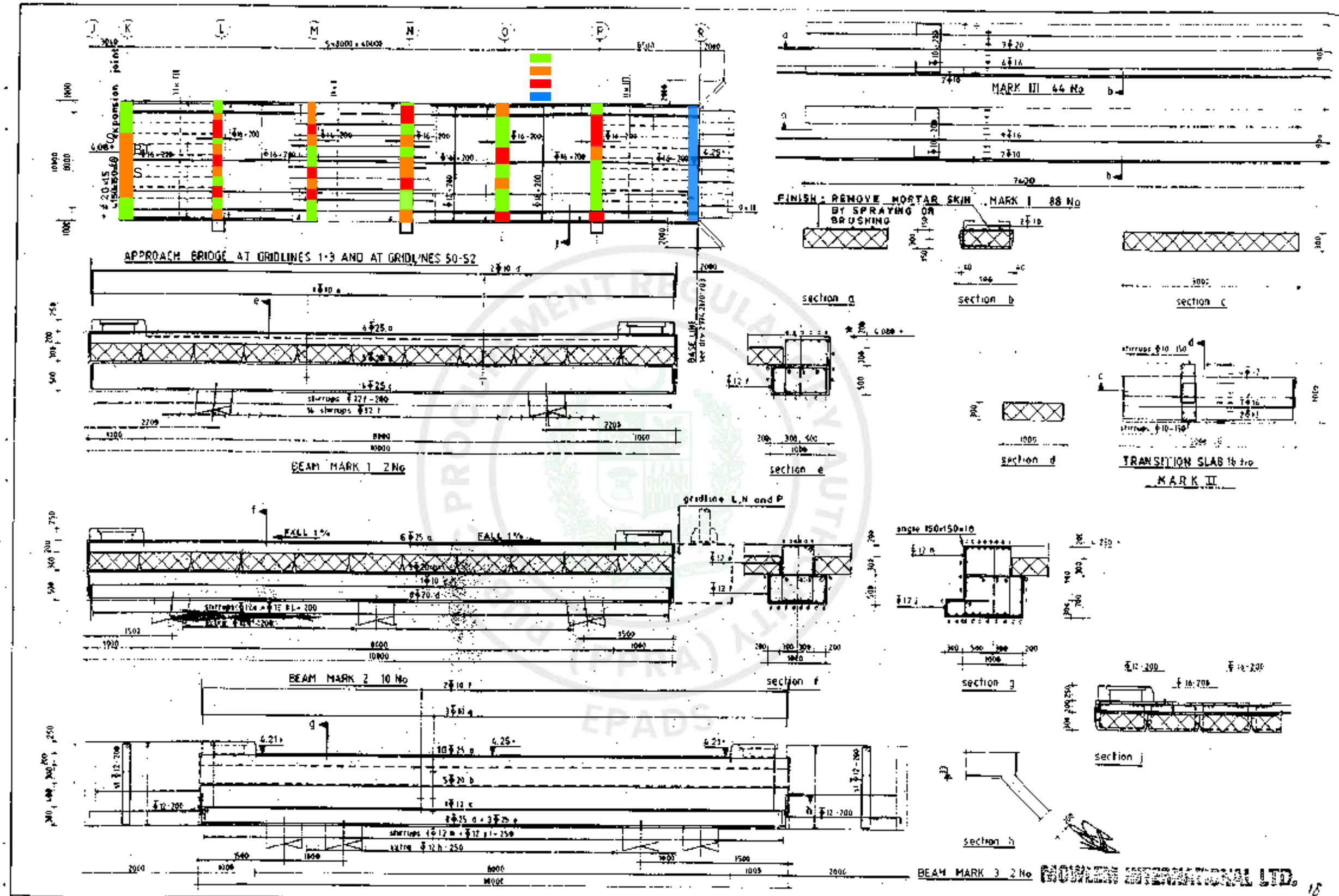

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DRAWN : BWJ	JETTIES	2974.21/03/13
CHECKED :	UNLOADING JETTY	SCALE:
APPROVED:	APPROACH BRIDGE AT GRIDLINES	

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A-1
Schedule-A to Bid

SCHEDULE OF ADJUSTMENT DATA

Schedule of Cost Indexation

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

Pn= a + b Ln / Lo + c En/ Eo + d Mn/Mo + ...

where:

"Pn" is the adjustment multiplier to be applied to the estimated Contract value in the relevant currency of the work carried out in period "n", this period being a month;
"a" is a fixed coefficient, stated in the relevant table of adjustment data, representing the non-adjustable portion in contractual payments;

"b", "c", "d", ... are coefficients representing the estimated proportion of each cost element related to the execution of the Works as stated in the relevant table of adjustment data; such tabulated cost elements may be indicative of resources such as labour, equipment and materials;

"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 particularPayment 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.

The weightings (coefficients) for each of the factors of cost stated in the following table(s) of adjustment data shall only be adjusted if they have been rendered unreasonable, unbalanced or inapplicable, as a result of Variation(s).

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A-2
Schedule-A to Bid

SCHEDULE OF ADJUSTMENT DATA

The source of indices and the weightages or coefficients for use in the adjustment formula under Sub-Clause 13.7 of Conditions of Contract shall be as follows:

Cost Element	Description	Weightages	Applicable index
(i)	Fixed Portion	0.36	
(ii)	Local Labour[1]	0.25	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.
(iii)	Cement – in bags. Portland cement shall be considered representative items for all types of cement.	0.09	"
(iv)	Steel Reinforcement[2]	0.10	"
(v)	High Speed Diesel (HSD)	0.20	"
	Total	1.00	

Notes:

a) The base cost indices or prices shall be those applying 28 days prior to the latest day for submission of bids. Current indices or prices shall be those applying 28 days prior to the last day of the billing period.

b) Any fluctuation in the indices or prices of materials other than those given above shall not be subject to adjustment of the Contract Price.

c) For item (ii) above, in the weightage factor of labour, the effect of skilled, semi-skilled and unskilled labour has been taken. However, for the calculation purpose, the base and current price shall be taken from Federal Bureau of Statistics Bulletin for unskilled labour.

d) For item (iii) above, the rate of ordinary Portland cement (referred as “cement” in the said statistical Bulletin) per bag shall be used.

e) For item (iv) above, In the weightage factor of Steel Reinforcement, the effect of various types of steel has been taken. However, for the calculation purpose, the base and current price shall be taken from Federal Bureau of Statistics Bulletin for Iron bars ½’’ round (M.S. bars per tonne).

f) For the purpose of this Sub-Clause, the rates for Karachi shall be used.

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