IRRIGATION DEPARTMENT
GOVERNMENT OF SINDH

CHIEF ENGINEER IRRIGATION DEVELOPMENT REGION HYDERABAD

PROJECT DIRECTOR SCARP NORTH ROHRI SHAHEED BENAZIRABAD

Name of Scheme: - REMOVING DEFICIENCIES & CONSTRUCTION OF REMAINING WORKS OF DRAINAGE SCHEME PHULL DAULATPUR, DISTRICT NAUSHAHRO FEROZE (ADP NO. 1015 / 2014-15)

Name of Work: - CONSTRUCTION OF PUMPING STATION (01 NO.), MAKING DIRECT DISPOSAL ARRANGEMENT OF PUMPS FOR PUMPING STATION & CONSTRUCTION OF OPERATOR QUARTERS (02 NOS.)

Package No: 01

February 2015

EXECUTIVE ENGINEER DRAINAGE DIVISION L.B.O.D SHAHEED BENAZIRABAD

SUMMARY OF CONTENTS

INSTRUCTIONS
TO BIDDERS
&
BIDDING DATA

Notes on the Instructions to Bidders

This section of the bidding documents should provide the information necessary for bidders to prepare responsive bids, in accordance with the requirements of the Procuring Agency. It should also give information on bid submission, opening and evaluation, and on the award of contract.

Matters governing the performance of the Contract or payments under the Contract, or matters affecting the risks, rights, and obligations of the parties under the Contract are not normally included in this Section, but rather in the appropriate sections of the Conditions of Contract and/or Contract Data.

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INSTRUCTIONS TO BIDDERS

A. GENERAL

IB.1 Scope of Bid & Source of Funds

1.1 Scope of Bid

The Procuring Agency as defined in the Bidding Data (**"Executive Engineer Drainage Division LBOD Shaheed Benazirabad"**) wishes to receive Bids for the Works summarized in the Bidding Data (**"Construction of Pumping Station (01 No.), Making Direct Disposal Arrangements of Pumps for Pumping Station & Construction of Operator Quarters (02 Nos.)"**.

Bidders must quote for the complete scope of work. Any Bid covering partial scope of work will be rejected as non-responsive.

1.2 Source of Funds

The Procuring Agency has arranged funds **by Government of Sindh from ADP**, which may be indicated accordingly in bidding data towards the cost of the **"Removing Deficiencies & Construction of Remaining Works of Phull Daulatpur Drainage Scheme, District Naushahroferoze" (ADP No. 1015/2014-15)**

IB.2 Eligible Bidders

2.1 Bidding is open to all firms and persons meeting the following requirements:

a) Duly licensed by the Pakistan Engineering Council (PEC) in the appropriate
category for value of works.

b) Duly pre-qualified with the Procuring Agency.

In the event that prequalification of potential bidders has been undertaken, only bids from prequalified bidders will be considered for award of Contract.

IB.3 Cost of Bidding

3.1 The bidder shall bear all costs associated with the preparation and submission of its bid and the Procuring Agency will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process (SPP Rules 24 & 25)

B. BIDDING DOCUMENTS

IB.4 Contents of Bidding Documents

4.1 In addition to Invitation for Bids, the Bidding Documents are those stated below, and should be read in conjunction with any Addendum issued in accordance with Sub-Clause IB.6.1.

1. Instructions to Bidders & Bidding Data
2. Form of Bid, Qualification Information & Schedules to Bid Schedules to Bid comprise the following:

(i) Schedule A: Schedule of Prices/ Bill of Quantities (BoQ).
(ii) Schedule B: Specific Works Data
(iii) Schedule C: Works to be Performed by Subcontractors
(iv) Schedule D: Proposed Programme of Works
(v) Schedule E: Method of Performing Works
(vi) Schedule F: Integrity Pact (works costing Rs 10 million and above)

3. Conditions of Contract & Contract Data

4.2 Standard Forms:

(i) Form of Bid Security,
(ii) Form of Performance Security;
(iii) Form of Contract Agreement;
(iv) Form of Bank Guarantee for Advance Payment.

5. Specifications: -

6. Drawings, Attached

4.2 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 Bid Document will be rejected.

IB.5 Clarification of Bidding Documents

5.1 A prospective bidder requiring any clarification(s) in respect of the Bidding Documents may notify the Engineer/Procuring Agency at the Engineer's/ Procuring Agency's address indicated in the Bidding Data.

5.2 An interested bidder, who has obtained bidding documents, may request for clarification of contents of bidding documents in wri.ing and procuring agency shall respond to such quarries in writing within three calendar days, provided they are received at least five calendar days prior to the date of opening of bid (SPP Rule 23-1).

IB.6 **Amendment of Bidding Documents (SPP Rules 22(2) & 22).**

6.1 At any time prior to the deadline for submission of Bids, the Procuring Agency may, for any reason, whether at his own initiative or in response to a clarification requested by a interested bidder, modify the Bidding Documents by issuing addendum.

6.2 Any addendum thus issued shall be part of the Bidding Documents pursuant to Sub-Clause 6.1 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 Procuring Agency.

6.3 To afford interested bidders reasonable time in which to take an addendum into account in preparing their Bids, the Procuring Agency may at its discretion extend the deadline for submission of Bids.

C. PREPARATION OF BIDS

IB.7 **Language of Bid**

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

IB.8 **Documents Comprising the Bid**

8.1 The Bid submitted by the bidder shall comprise the following:

(a) Covering Letter

(b) Form of Bid duly filled, signed and sealed, in accordance with Sub-Clause IB.14.3.

(c) Schedules (A to F) to Bid duly filled and initialed, in accordance with the instructions contained therein & in accordance with Sub-Clause IB14.3.

(d) Bid Security furnished in accordance with Clause IB.13.

(e) Power of Attorney in accordance with Sub-Clause IB 14.5.

(f) Documentary evidence in accordance with Clause IB.11

(g) Documentary evidence in accordance with Clause IB.12.

IB.9 Sufficiency of Bid

9.1 Each bidder shall satisfy himself before Bidding as to the correctness and sufficiency of his Bid and of the prices quoted/entered in the BoQ, which rates and prices shall except in so far as it is otherwise expressly provided in the Contract, cover all his obligations under the Contract and all matters and things necessary for the proper completion of the works.

9.2 The bidder is advised to obtain for himself at his own cost and responsibility all information that may be necessary for preparing the bid and entering into a Contract for execution of the Works.

IB.10 Bid Prices, Currency of Bid and Payment

10.1 The bidder shall fill up the Schedule of Prices (Schedule A to Bid) including the unit rates and prices of the Works to be performed under the Contract. Prices in the Schedule of Prices shall be quoted entirely in Pak Rupees keeping in view the instructions contained in the Preamble to Schedule of Prices and payment shall be made in Pak Rupees.

10.2 Unless otherwise stipulated in the Conditions of Contract, prices quoted by the bidder shall remain fixed during the bidder's performance of the Contract and not subject to variation on any account.

10.3 The unit rates and prices in the Schedule of Prices shall be quoted by the bidder in the currency as stipulated in Bidding Data.

10.4 Items for which no rate or price is entered by the Bidder will not be paid for by the Procuring Agency when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.

IB.11 Documents Establishing Bidder's Eligibility and Qualifications

11.1 Pursuant to Clause IB.8, the bidder shall furnish, as part of its bid, documents establishing the bidder's eligibility to bid and its qualifications to perform the Contract if its bid is accepted.

11.2 Bidder must possess and provide evidence of its capability and the experience as stipulated in Bidding Data and the Qualification Criteria mentioned in the Bidding Documents.

IB.12 Documents Establishing Works' Conformity to Bidding Documents

12.1 The documentary evidence of the Works'conformity to the Bidding Documents may be in the form of literature, drawings and data and the bidder shall furnish documentation as set out in Bidding Data.

12.2 The bidder shall note that standards for workmanship, material and equipment, and references to brand names or catalogue numbers, if any, designated by the Procuring Agency in the Technical Provisions are intended to be descriptive only and not restrictive.

IB.13 Bid Security

13.1 Each bidder shall furnish, as part of his bid, at the option of the bidder, a Bid Security as **02** percentage of bid price in Pak. Rupees in the form of Deposit at Call issued by a Scheduled Bank in Pakistan in favour of the Procuring Agency **(Executive Engineer Drainage Division LBOD Shaheed Benazirabad).**

13.2 Any bid not accompanied by an acceptable Bid Security shall be rejected by the Procuring Agency as non-responsive.

13.3 The bid securities of unsuccessful bidders will be returned upon award of contract to the successful bidder or on the expiry of validity of Bid Security whichever is earlier.

13.4 The Bid Security of the successful bidder will be returned after **(03) Months to completion of the project.**

13.5 The Bid Security may be forfeited:

(a) if a bidder withdraws his bid during the period of bid validity; or

(b) if a bidder does not accept the correction of his Bid Price, pursuant to Sub-Clause 16.4 (b) hereof; or

(c) in the case of a successful bidder, if he fails within the specified time limit to:

(i) Sign the Contract Agreement.

IB.14 Validity of Bids, Format, Signing and Submission of Bid

14.1 Bids shall remain valid for the period stipulated in the Bidding Data after the date of bid opening.

14.2 In exceptional circumstances, Procuring Agency may request the bidders to extend the period of validity for an additional period but not exceeding 1/3 of the original period. The request and the bidders'responses shall be made in writing or by cable. A Bidder may refuse the request without forfeiting the Bid Security. A Bidder agreeing to the request will not be required or permitted to otherwise

modify the Bid, but will be required to extend the validity of Bid Security for the period of the extension, and in compliance with IB.13 in all respects (SPP Rule 38).

14.3 **All Schedules to Bid are to be properly completed and signed.**

14.4 No alteration is to be made in the Form of Bid except in filling up the blanks as directed.

If any alteration be made or if these instructions be not fully complied with, the bid may be rejected.

14.5 Each bidder shall prepare Original and number of copies specified in the Bidding Data of the documents comprising the bid as described in IB.8 and clearly mark them "ORIGINAL" and "COPY" as appropriate. In the event of discrepancy between them, the original shall prevail.

14.6 The original and all copies of the bid shall be typed or written in indelible ink and shall be signed by a person or persons duly authorized to sign (in the case of copies, Photostats are also acceptable). This shall be indicated by submitting a written Power of Attorney authorizing the signatory of the bidder to act for and on behalf of the bidder. All pages of the bid shall be initialed and official seal be affixed by the person or persons signing the bid.

14.7 The Bid shall be delivered in person or sent by registered mail at the address to Procuring Agency as given in Bidding Data. Bidder shall indicate their full and proper addresses which notices may be legally served in them and which all cross pan dance in connection with their bids.

D. SUBMISSION OF BID

IB.15 Deadline for Submission, Modification & Withdrawal of Bids

15.1 Bids must be received by the Procuring Agency at **Office of the Executive Engineer Drainage Division LBOD Shaheed Benazirabad** not later than **20.03.2015 at 12.30 P.M &** will be opened on the same day **i.e 20.03.2015 at 1.15 P.M.**

15.2 The inner and outer envelopes shall

(a) be addressed to the Procuring Agency at the address provided in the Bidding Data;

(b) bear the name and identification number of the Contract as defined in the Bidding and Contract Data; and

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

(d) in addition to the identification required in 15.2, the inner envelopes shall indicate the name and address of the Bidder to enable the Bid to be returned unopened in case it is declared late.

(e) If the outer envelope is not sealed and marked as above, the Procuring Agency will assume no responsibility for the misplacement or premature opening of the Bid.

15.3 Bids submitted through telegraph, telex, fax or e-mail shall not be considered.

15.4 Any bid received by the Procuring Agency after the deadline for submission prescribed in Bidding Data will be returned unopened to such bidder.

15.5 Any bidder may modify or withdraw his bid after bid submission provided that the modification or written notice of withdrawal is received by the Procuring Agency prior to the deadline for submission of bids.

15.6 Withdrawal of a bid during the interval between the deadline for submission of bids and the expiration of the period of bid validity specified in the Form of Bid may result in forfeiture of the Bid Security pursuant to IB.13.5 (a).

E. BID OPENING AND EVALUATION

IB.16 Bid Opening, Clarification and Evaluation (SPP Rules 41, 42 & 43)

16.1 The Procuring committee will open the bids, in the presence of bidders' representatives who choose to attend, at **20.03.2015 at 12.30 P.M in the Office of the Executive Engineer Drainage Division LBOD Shaheed Benazirabad**.

16.2 The bidder's name, Bid Prices, any discount, the presence or absence of Bid Security, and such other details as the Procuring Agency at its discretion may consider appropriate, will be announced by the Procuring Agency at the bid opening. The Procuring Agency will record the minutes of the bid opening. Representatives of the bidders who choose to attend shall sign the attendance sheet.

Any Bid Price or discount which is not read out and recorded at bid opening will not be taken into account in the evaluation of bid.

16.3 To assist in the examination, evaluation and comparison of Bids the Engineer/Procuring Agency may, at its discretion, ask the bidder for a clarification of its Bid. The request for clarification and the response shall be in writing and no change in the price or substance of the Bid shall be sought, offered or permitted (SPP Rule 43).

16.4 (a) Prior to the detailed evaluation, pursuant to IB.16.7 to 16.9, the Engineer/Procuring Agency will determine the substantial responsiveness of each bid to the Bidding Documents. For purpose of these instructions, a substantially responsive bid is one which conforms to all the terms and conditions of the Bidding Documents without material deviations. It will include determining the requirements listed in Bidding Data.

(b) Arithmetical errors will be rectified on the following basis:

If there is a discrepancy between the unit price and total price that is obtained by multiplying the unit price and quantity, the unit price shall prevail and the total price shall be corrected. If there is a discrepancy between the words and figures the amount in words shall prevail. If there is a discrepancy between the Total Bid price entered in Form of Bid and the total shown in Schedule of Prices-Summary, the amount stated in the Form of Bid will be corrected by the Procuring Agency in accordance with the Corrected Schedule of Prices.

If the bidder does not accept the corrected amount of Bid, his Bid will be rejected and his Bid Security forfeited.

16.5 A Bid determined as substantially non-responsive will be rejected and will not subsequently be made responsive by the bidder by correction of the non-conformity.

16.6 Any minor informality or non-conformity or irregularity in a Bid which does not constitute a material deviation (major deviation) may be waived by Procuring Agency, provided such waiver does not prejudice or affect the relative ranking of any other bidders.

(A). **Major (material) Deviations include:-**

(i) has been not properly signed;

(ii) is not accompanied by the bid security of required amount and manner;

(iii) stipulating price adjustment when fixed price bids were called for;

(iv) failing to respond to specifications;

(v) failing to comply with Mile-stones/Critical dates provided in Bidding Documents;

(vi) sub-contracting contrary to the Conditions of Contract specified in Bidding Documents;

(vii) refusing to bear important responsibilities and liabilities allocated in the Bidding Documents, such as performance guarantees and insurance coverage;

(viii) taking exception to critical provisions such as applicable law, taxes and duties and dispute resolution procedures;

(ix) a material deviation or reservation is one :

(a) which affect in any substantial way the scope, quality or performance of the works;

(b) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids.

(B) Minor Deviations

Bids that offer deviations acceptable to the Procuring Agency and which can be assigned a monetary value may be considered substantially responsive at least as to the issue of fairness. This value would however be added as an adjustment for evaluation purposes only during the detailed evaluation process.

16.7 The Engineer/Procuring Agency will evaluate and compare only the bids previously determined to be substantially responsive pursuant to IB.16.4 to 16.6 as per requirements given hereunder. Bids will be evaluated for complete scope of works. The prices will be compared on the basis of the Evaluated Bid Price pursuant to IB.16.8 herein below.

Technical Evaluation: It will be examined in detail whether the works offered by the bidder complies with the Technical Provisions of the Bidding Documents. For this purpose, the bidder's data submitted with the bid in Schedule B to Bid will be compared with technical features/criteria of the works detailed in the Technical Provisions. Other technical information submitted with the bid regarding the Scope of Work will also be reviewed.

16.8 Evaluated Bid Price

In evaluating the bids, the Engineer/Procuring Agency will determine for each bid in addition to the Bid Price, the following factors (adjustments) in the manner and to the extent indicated below to determine the Evaluated Bid Price:

(i) making any correction for arithmetic errors pursuant to IB.16.4 hereof.

(ii) discount, if any, offered by the bidders as also read out and recorded at the time of bid opening.

(iii) excluding provisional sums and the provisions for contingencies in the Bill of Quantities if any, but including Day work, where priced competitively.

(iv) Making an appropriate adjustment for any other acceptable variation or deviations.

16.9 The estimate effect of the price adjustment provisions of the condition of contract, applied over the period of execution of the contract, shall not be taken into account in Bid evaluation.

16.10 If the Bid of successful bidder is seriously unbalanced in relation to the procuring Agency's estimate of the cost of work to be performed under the contract. The procuring Agency may require the bidder to produce detailed price analysis for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the construction methods and schedule proposed. After

evaluation of the price analyses, the procuring Agency is authorized to accept or not accept unbalanced amount against the estimate.

IB.17 Process to be Confidential

17.1 Subject to IB.16.3 heretofore, no bidder shall contact Engineer/Procuring Agency on any matter relating to its Bid from the time of the Bid opening to the time the bid evaluation result is announced by the Procuring Agency. The evaluation result shall be announced at least seven (07) days prior to award of Contract (SPP Rule 45). 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.

17.2 Any effort by a bidder to influence Engineer/Procuring Agency in the Bid evaluation, Bid comparison or Contract Award decisions may result in the rejection of his Bid. Whereas any bidder feeling aggrieved, may lodge a written complaint to Complaint Redressal Committee as per terms and conditions mentioned in SPP Rules 31 & 32. However, mere fact of lodging a complaint shall not warrant suspension of procurement process.

17.3 Bidders may be excluded if involved in "Corrupt and Fraudulent Practices" means either one or any combination of the practices given below SPP Rule2(q);

(i) "Coercive Practice" means any impairing or harming, or threatening to impair or harm, directly or indirectly, any party or the property of the party to influence the actions of a party to achieve a wrongful gain or to cause a wrongful loss to another party;

(ii) "Collusive Practice" means any arrangement between two or more parties to the procurement process or contract execution, designed to achieve with or without the knowledge of he procuring agency to establish prices at artificial, noncompetitive levels for any wrongful gain;

(iii) "Corrupt Practice" means the offering, giving, receiving or soliciting, indirectly or indirectly, of anything of value to influence the acts of another party for wrongful gain;

(iv) "Fraudulent Practice" means any act or omission, including a misrepresentation, that knowingly or recklessly misleads, or attempts to mislead, a party to obtain a financial or other benefit or to avoid an obligation;

(v) "Obstructive Practice" means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in a procurement process, or affect the execution of a contract or deliberately destroying, falsifying, altering or concealing of evidence material to the investigation or making false statements before investigators in order to materially impede an investigation into allegations of a corrupt, fraudulent, coercive or collusive practice; or threatening, harassing or intimidating any party to prevent it from disclosing its knowledge of matters relevant to the investigation or from pursuing the investigation, or acts intended to materially impede the exercise of inspection and audit rights provided for under the Rules.

F. AWARD OF CONTRACT

IB.18. Post Qualification

18.1 The Procuring Agency, at any stage of the bid evaluation, having credible reasons for or prima facie evidence of any defect in contractor's capacities, may require the contractors to provide information concerning their professional, technical, financial, legal or managerial competence whether already pre-qualified or not:

Provided, that such qualification shall only be laid down after recording reasons therefore in writing. They shall form part of the records of that bid evaluation report.

18.2 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 bidders' qualifications submitted under B.11, as well as such other information required in the Bidding Documents.

IB.19 Award Criteria & Procuring Agency's Right

19.1 Subject to IB.19.2, the Procuring Agency will award the Contract to the bidder whose bid has been determined to be substantially responsive to the Bidding Documents and who has offered the lowest evaluated Bid Price, provided that such bidder has been determined to be qualified to satisfactory perform the Contract in accordance with the provisions of the IB.18.

19.2 Not withstanding IB.19.1, the Procuring Agency reserves the right to accept or reject any bid, and 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 to inform the affected bidders of the grounds for the Procuring Agency's action except that the grounds for its rejection of all bids shall upon request be communicated, to any bidder who submitted a bid, without justification of the grounds. Notice of the rejection of all the bids shall be given promptly to all the bidders (SPP Rule 25).

IB.20 Notification of Award & Signing of Contract Agreement

20.1 Prior to expiration of the period of bid validity prescribed by the Procuring Agency, the Procuring Agency will notify the successful bidder in writing ("Letter of Acceptance") that his bid has been accepted (SPP Rule [illegible]).

20.2 Within seven (07) days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Procuring Agency will send the successful bidder the Form of Contract Agreement provided in the Bidding Documents, incorporating all agreements between the parties.

20.3 The formal agreement between the Procuring Agency and the successful bidder [illegible]ped at rate of **0.30%** of bid price(updated from time to time) stated in Letter of Acceptance shall be executed within seven (07) days of the receipt of Form of Contract Agreement by the successful bidder from the Procuring Agency.

NOT APPLICABLE

IB.21 **Performance Security**

21.1 The successful bidder shall furnish to the Procuring Agency a Performance Security in the form and the amount stipulated in the Conditions of Contract within a period of fourteen (14) days after the receipt of Letter of Acceptance (SPP 39).

21.2 Failure of the successful bidder to comply with the requirements of Sub-Clauses IB.20.2 & 20.3 or 21.1 or Clause IB.22 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security.

21.3 Publication of Award of Contract: within seven days of the award of contract, the procuring shall publish on the website of the authority and on its own website, if such a website exists, the results of the bidding process, identifying the bid through the procurement identifying Number if any and the following information:

(1) Evaluation Report
(2) Form of Contract and letter of Award;
(3) Bill of Quantities or Schedule of Requirements. (SPP Rule 50)

NOT APPLICABLE

IB.22 Integrity Pact The Bidder shall sign and stamp the Form of Integrity Pact provided at Schedule-F to Bid in the Bidding Document for all Sindh Government procurement contracts exceeding Rupees ten (10) million. Failure to provide such Integrity Pact shall make the bid non-responsive (SPP Rule 89).

BIDDING DATA

Instructions to Bidders
Clause Reference

1.1 Name of Procuring Agency

Executive Engineer Drainage Division LBOD Shaheed Benazirabad.

Brief Description of Works

"Removing Deficiencies & Construction of Remaining Works of Phull Daulatpur Drainage Scheme, District Naushahroferoze" (ADP No. 1015/2014-15)

PACKAGE NO: 01

Bill No. 01 **Construction of Pumping Station (01 No.)**

Bill No. 02 **Making Direct Disposal Arrangements of Pumps for Pumping Station**

Bill No. 03 **Construction of Operator Quarters (02 Nos.)**

5.1 (a) Procuring Agency's address: **Office of the Executive Engineer Drainage Division LBOD Shaheed Benazirabad,**
Tel. +92 0244 9370438, Fax. +92 0244 9370438.

(b) Engineer's address: **ZAHEER AHMED MEMON Executive Engineer, Drainage Division LBOD Shaheed Benazirabad.**
Tel. +92 0244 9370438, Fax. +92 0244 9370438.

10.3 Bid shall be quoted entirely in Pak. Rupees. The payment shall be made in Pak. Rupees.

11.2 Constructor/firms already pre-qualified. **With the procuring Agency**

12.1 (a) A detailed description of the Works, essential technical and performance characteristics.

(b) Complete set of technical information, description data, literature and drawings as required in accordance with Schedule B to Bid, Specific Works Data. This will include but not be limited to a sufficient number of drawings, photographs, catalogues, illustrations and such other information as is

necessary to illustrate clearly the significant characteristics such as general construction dimensions and other relevant information about the works to be performed.

13.1 Amount of Bid Security

02% of Bid Price

14.1 Period of Bid Validity
14 Days

14.4 Number of Copies of the Bid to be submitted:

One original plus **02** copies.

14.6 (a) Procuring Agency's Address for the Purpose of Bid Submission

Office of the Executive Engineer Drainage Division LBOD Shaheed Benazirabad.

15.1 Deadline for Submission of Bids

Time: **20.03.2015 at 12.30 P.M**

16.1 Venue, Time, and Date of Bid Opening

Venue: **Office of the Executive Engineer Drainage Division LBOD Shaheed Benazirabad.**

Time: **20.03.2015 at 12.30 P.M**

16.4 Responsiveness of Bids

(i) Bid is valid till required period,

*(ii) Bid prices are firm during currency of contract/Price adjustment;

(iii) Completion period offered is within specified limits,
(25 Months).

(v) Bidder is eligible to Bid and possesses the requisite experience, capability and qualification.

(vi) Bid does not deviate from basic technical requirements and

(vii) Bids are generally in order, etc.

*Procuring agency can adopt either of two options. (Select either of them)

(a) **Fixed Price contract:** In these contracts no escalation will be provided during currency of the contract and the period of completion of these works is upto 12 months.

NOT APPLICABLE

(b) **Price adjustment contract:** In these contracts escalation will be paid only on those items and in the manner as notified by Finance Department, Government of Sindh, after bid opening during currency of the contract.

FORM OF BID AND SCHEDULES TO BID

FORM OF BID

Bid Reference No. **"Removing Deficiencies & Construction of Remaining Works of Phull Daulatpur Drainage Scheme, District Naushahroferoze" (ADP No. 1015/2014-15)**

To: **Executive Engineer,**
Drainage Division LBOD,
Shaheed Benazirabad

Gentlemen,

1. Having examined the Bidding Documents including Instructions to Bidders, Bidding Data, Conditions of Contract, Contract Data, Specifications, Drawings, if any, Schedule of Prices and Addenda Nos. _____ for the execution of the above-named works, we, the undersigned, being a company doing business under the name of and address _____

and being duly incorporated under the laws of Pakistan hereby offer to execute and complete such works and remedy any defects therein in conformity with the said Documents including Addenda thereto for the Total Bid Price of Rs_____(Rupees_____ _____) or such other sum as may be ascertained in accordance with the said Documents.

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

3. As security for due performance of the undertakings and obligations of this Bid, we submit herewith a Bid Security in the amount of _____ drawn in your favour or made payable to you and valid for a period of twenty eight (28) days beyond the period of validity of Bid.

4. We undertake, if our Bid is accepted, to commence the Works and to deliver and complete the Works comprised in the Contract within the time(s) stated in Contract Data.

5. We agree to abide by this Bid for the period of _____ days from the date fixed for receiving the same and it shall remain binding

upon us and may be accepted at any time before the expiration of that period.

6. 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.

7. We undertake, if our Bid is accepted, to execute the Performance Security referred to in Conditions of Contract for the due performance of the Contract.

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

9. We do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other person or persons making a bid for the Works.

Dated this _____day of _____, 20

Signature _____

in the capacity of _____duly authorized to sign bid for and on behalf of

_____
(Name of Bidder in Block Capitals)
(Seal)

Address

_____

_____

_____

Witness:

(Signature)_____

Name:

_____
Address:

_____

[SCHEDULES TO BID INCLUDE THE FOLLOWING:

- Schedule A to Bid: Schedule of Prices
- Schedule B to Bid: Specific Works Data
- Schedule C to Bid: Works to be Performed by Subcontractors
- Schedule D to Bid: Proposed Program of Works
- Schedule E to Bid: Method of Performing Works
- Schedule F to Bid: Integrity Pact]

SCHEDULE – A TO BID

SCHEDULE OF PRICES

Sr. No. Page No.

* [To be prepared by the Engineer/Procuring Agency]

PREAMBLE TO SCHEDULE OF PRICES

1. General

1.1 The Schedule of Prices shall be read in conjunction with the Conditions of Contract, Contract Data together with the Specifications and Drawings, if any.

1.2 The Contract shall be for the whole of the works as described in these Bidding Documents. Bids must be for the complete scope of works.

2. Description

2.1 The general directions and descriptions of works and materials are not necessarily repeated nor summarized in the Schedule of Prices. References to the relevant sections of the Bidding Documents shall be made before entering prices against each item in the Schedule of Prices.

3. Units & Abbreviations

3.1 Units of measurement, symbols and abbreviations expressed in the Bidding Documents shall comply with the System internationaled'Unites (SI Units).

Unit of Measurements already indicate in 130 Q

(Note: The abbreviations to be used in the Schedule of Prices to be defined by the Procuring Agency).

4. Rates and Prices

4.1 Except as otherwise expressly provided under the Conditions of Contract, the rates and amounts entered in the Schedule of Prices shall be the rates at which the Contractor shall be paid and shall be the full inclusive value of the works set forth or implied in the Contract; except for the amounts reimbursable, if any to the Contractor under the Contract.

4.2 Unless otherwise stipulated in the Contract Data, the premium, rates and prices entered by the bidder shall not be subject to adjustment during the performance of the Contract.

4.3 All duties, taxes and other levies payable by the Contractor shall be included in the rates and prices.

4.4 The whole cost of complying with the provisions of the Contract shall be included in the items provided in the Schedule of Prices, 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 and no separate payment will be made for those items.

The rates, prices and amounts shall be entered against each item in the Schedule of Prices. Any item against which no rate or price is entered by the bidder will not be paid for by the Procuring Agency when executed and shall be deemed covered by the rates and prices for other items in the Schedule of Prices.

4.5 (a) The bidder shall be deemed to have obtained all information as to and all requirements related thereto which may affect the bid price.

*(b) The Contractor shall be responsible to make complete arrangements for the transportation of the Plant to the Site.

*(Procuring Agency may modify as appropriate)

4.6 The Contractor shall provide for all parts of the Works to be completed in every respect. Notwithstanding that any details, accessories, etc. required for the complete installation and satisfactory operation of the Works, are not specifically mentioned in the Specifications, such details shall be considered as included in the Contract Price.

5. Bid Prices

5.1 **Break-up of Bid Prices**

The various elements of Bid Prices shall be quoted as detailed by the Procuring Agency in the format of Schedule of Prices.
The bidder shall recognize such elements of the costs which he expects to incur the performance of the Works and shall include all such costs in the rates and amounts entered in the Schedule of Prices.

5.2 **Total Bid Price**

The total of bid prices in the Schedule of Prices shall be entered in the Summary of Bid Prices. Provisional Sums and Day work.

6.0 Provisional suns and day work.

6.1 Provisional Sums included and so designated in the Schedule of Prices if any, shall be expended in whole or in part at the direction and discretion of the Engineer/Procuring Agency. The Contractor will only receive payment in respect of Provisional Sums, if he has been instructed by the Engineer/Procuring Agency to utilize such sums.

6.2 Day work rates in the contractor's bid are to be used for small additional amounts of work and only when the Engineer have given written instructions in advance for additional work to be paid for in that way.

SCHEDULE - A TO BID

SCHEDULE OF PRICES

Total (to be carried to Summary of Bid Price)
Add/ Deduct the percentage quoted above/below on the prices of items based on Composite Schedule of Rates

NAME OF SCHEME : - **REMOVING DEFICIENCIES AND CONSTRUCTION OF REMAINING WORKS OF PHULL DAULATPUR DRAINAGE SCHEME, DISTRICT NAUSHAHROFEROZE. (ADP NO: 1015 / 2014-15)**

PACKAGE NO: 01

NAME OF WORK : - **CONSTRUCTION OF PUMPING STATION (01 NO), MAKING DIRECT DISPOSAL ARRACGEMENTS FOR PUMPS (01 NO) & CONSTRUCTION OF OPERATOR QUARTERS (02 NOS.)**

Bill Nr.	Description	Amount
1	Construction of 01 No Pumping Station	
2	Making Direct Disposal Arrangement for Pumps	
3	Construction of Operator Quarter of Pumping Station. (02 Nos.)	
Total amount (in words) :-		

PACKAGE NO: 01

Bill Nr. 01 CONSTRUCTION OF PUMPING STATION

Item No.	Description	Qty:	Rate	Unit	Amount
1	Excavation in foundation of buildings, bridges and other structures i/c dag, belling dressing, refilling around structure with excavated earth watering and ramming lead up to one chain and lift up to 5ft: b) In ordinary soil. (GSS-2012, P-4, Item-18)(b)	112,800 Cft	3176.25	%0 Cft	358,281
2	Extra for wet earth work. (GSS-2012, P-3, Item-15)	90,240 Cft	1058.75	%0 Cft	95,542
3	Rehandling of earth work. b) Up to lead of 50 ft: (GSS\2012, P-3, Item-9(b). (02 Times)	101,520 Cft	2117.50	%0 Cft	214,969
4	Erection and removal of centering for R.C.C or plain cement concrete works of partal wood (2nd class) a) Vertical. (GSS-2012, P-17, Item-19(a).	229 Sft:	3127.41	% Sft:	7,162
5	Cement concrete plain i/c placing compacting, finishing and curing complete (i/c screening and washing of stone aggregate without shuttering). i) Ratio 1:4:8. (GSS-2012, P-15, Item-56(i).	1,490 Cft	11288.75	% Cft	168,146
6	Reinforced cement concrete work i/c all labour and material except the cost of steel reinforcement and its labour for bending and binding which will be paid separately. This rate also includes all kinds of forms, molds, lifting shuttering, curing, rendering and finishing and exposed surface (i/c screening and washing of shingle). a) R.C work in roof, slab, beams, columns, rafts, lintels and other structural members laid in site or precast laid in position. i) Ratio 1:2:4 90Lbs: cement sand 4Cft shingle 1/8" to 1/4" . (GSS-2012, P-16, Item-6)(i)	6,486 Cft	337.00	P. Cft	2,185,770

Item No.	Description	Qty:	Rate	Unit	Amount
7	Fabrication of mild steel reinforcement for cement concrete i/c cutting, bending laying in position making joints and fastenings i/c cost of binding wire (also includes removal of rust from bars (b) using Tar Bars. (GSS-2012, P-16, Item-8(b)	347 Cwt:	5001.70	P.Cwt:	1,737,901
8	Pacca bricks work other than building i/c stricking of joints upto 20 ft: heidht in cement sand mortar 1:5 (GSS-2012, P- 21, I-7(d)	928 Cft	12574.38	% Cft	116,727
9	Cement Plaster 1:6 up to 20' height. b) 3/4" thick. (GSS-2012, P-58, Item-13 (c).	1,838 Sft:	2590.50	% Sft:	47,613
10	Cement Plaster 1:2 up to 20' height. b) 1/2" thick. (GSS-2012, P-51, Item-10(b).	1,838 Sft:	2344.59	% Sft:	43,094
11	White washing. (c) Three coats. (GSS-2012, P-53, Item-26(c).	1,838 Sft:	829.95	% Sft:	15,254
12	Distempering (c) Three coats. (GSS-2012, P-53, Item-24(c).	1,838 Sft:	1079.65	% Sft	19,844
13	Supplying and fixing steel grated door with 1/16" thick sheeting i/c angle iron frame 2"x2"x3/8" and 3/4" square bars 4" c/c with locking arrangement . (GSS-2012, P-91, Item-24).	108 Sft:	726.72	P.Sft:	78,486
14	Painting new surfaces:- (c) preparing surface and painting doors and windows any type (including edges). Three Coats. (GSS-2012, P-69, Item-5(c).	216 Sft:	2116.41	% Sft:	4,571
5	Supplying and fixing in position iron steel grill of 4"x1/4" size flate iron of approved design i/c painting 3 coats etc. complete weight not be less than 3-7Lbs:/Sq: of finishing grill.	120 Sft:	180.50	P.Sft:	21,660
16	Boring for Tubewell in all water bearing, soils from ground level up to 100' or 30.50 meter depth i/c sinking and with drawing. (a) 200 mm. (8" dia). (PHES-2012, P-41, Item-1) (a)	640 Rft:	535.00	P.Rft:	342,400
17	Supplying M.S bail plug (PHES-2012,part-VI, Vol-IV 2012, P-43 Item 8(b).	8 Nos.	2607.00	Each	20,856

Item No.	Description	Qty:	Rate	Unit	Amount
18	Supplying and fixing local make coir stainer of approved quality complete. (b) for 150 mm. (6' dia). (PHES-2012, P-44, Item-10(b).	240 Rft:	647.00	P.Rft:	155,280
19	Supplying and installing M.S blind pipe 3/16" thich (5 mm.) of best and approved quality and make including necessary socket etc. complete. (d) for 150 mm. (6" dia) blind pipe. (PHES-2012, P-44, Item-	400 Rft:	762.50	P.Rft:	305,000
20	Full hire charges of pumping set per day inclusive of the wages of driver and assistant fuel or electric energy plate form required for placing pumps etc. at lower depths with suction and delivery pipes for pumping out water found at various depths from trenches including the cost of erection and dismantling after completion of the job. (iii) Hire charges of pumping set above 10 H.P pumping out water from 20' deep trench. (PHES-2012, P-77, Item-23- (ii).	500 Days	2000.00	P.Day	1,000,000
21	NOTE:- For working the pump beyond 8 hours the following payment shall be made, the higher of the pumping set it self being for 24 hours. (i) For pumping set of above 10 H.P.	5,500 Hours	250.00	P.Hour	1,375,000
22	Barrow pit excavation undressed lead up to 100'. (a) Ordinary soil. (GSS-2012, P-1, Item-3(a).	33,300 Cft	2117.50	%0Cft	70,513
23	Dressing and Leveling of earth work to designed section ect complete GSS-2012. P-3. I-11 (b)	33,300 Cft	187.55	%0Cft	6,245
24	Wiring for plug point with 1/1.13 (3/029) PVC insulated wire in 20 mm. (3/4") PVC conduit on surface as required. (Electric Schedule-2012, P-2, Item-12).	6 Points	669.00	P.Point	4,014
25	Wiring for light or fan with 3/0 PVCE ins, wire 3/4" PVC conduct released wall or col. As required (GSS-2012, P-15, I- 124 Electrical)	6 Points	1130.00	P.Point	6,780
Total amount Rs: (in words):-					**8,401,108**

PACKAGE NO: 01

Bill Nr. 02 MAKING DIRECT DISPOSAL ARRANGEMENT OF PUMPS

Item No.	Description	Qty:	Rate	Unit	Amount
1	Excavation in foundation of building, bridges and other Structures i/c dag belling dressing refilling around structure with excavated earth watering ramming earth lead up to one chain and lift up to 5 ft: b) In ordinary soil. (GSS-2012, P-5, Item-18(b).	900 Cft	3176.25	%0 Cft	2,859
2	Cement Concrete plain i/c finishing and currying complete i/c screening and washing of stone aggregate without shuttering. b) Ratio 1:3:6. (GSS-2012, P-17, Item-5h).	600 Cft	12595.00	% Cft	75,570
3	Pacca brick work other than building i/c stricking of joints up to 20' height in cement sand mortar 1:5. (GSS-2012, P-23, Item-7).	900 Cft	12574.38	% Cft	113,169
4	Cement Plaster 1:5 up to 20' height. b) 1/2" thick. (GSS-2012, P-53, Item-12(b).	1,500 Sft	2241.80	% Sft:	33,627
5	M.S black steel pipe made out of M.S sheet of 5.56mm, W.T, 6.4mm W.T.7.1 mm W.T, 7.9 mm W.T 8.74mm, W.T, 9.5mm W.T, 10.31mm W.T 11.13mm W.T thickness confirming to APL 5L grade X-42 (Spirally Welled) (12" dia) (PHES- 2012, Material, V-III, Part-I, P-109, Item No: 06 (b).	1,140 Rft:	2093.57	P.Rft	2,386,670
6	C.I. Bends 45 12" dia with flanged ends with holes including turning and facing of flanges for all sizes. (PHES-2012, Material, V-III, Part-I, P-99, Item-	16 Nos.	6581.25	Each	105,300
7	Reflex valve heavy pattern (test pressure 21.0 kg/Sq or 300 Lbs/Sq: inch) (h) 300 mm 12" dia (PHE-Material-2012, Vol-III, Part-I, P-97, Item-6-g).	4 Nos.	21937.50	Each	87,750
8	Manufacturing and supplying M.S Reducer 12" x 10" dia from M.S sheet 3/16" thick sheeting i/c cutting and folding etc. complete. (PHES-2012, Vol-III, Part-I, P- 102, Item- 11)	4 Nos.	4260.00	Each	17,040

Item No.	Description	Qty:	Rate	Unit	Amount
9	Jointing C.I/M.S flanged pipes and specials flanged inside a trench i/c supplying rubber packing as required for joints to a specified pressure etc. complete. 300 mm (12"dia). (PHES-2012, Vol-III, Part-III, P-40, Item-1-h).	186 Joints	2239.00	P. Joints	416,454
10	Barrow pit excavation undressed lead up to 100'. (a) Ordinary Soil. (GSS-2012, P-1, Item-3(a).	41,250 Cft	2117.50	% 0Cft	87,347
11	Dressing and leveling of earth work to designed section etc complete in Ordinary soil	41,250 Cft	187.55	% 0Cft	7,736
12	Excavation for pipe line in trenches, and pits in soft soil i/c trimming and dressing sides to true aligment and shape levelling of beds of trenches to corret oevel and grade, cutting joints holes and display traffic, flages and temporary crossings for Non-vahicularlift lead utpo 5ft	4,800 Cft	3600.00	%0 Cft	17,280
13	Refilling the excavated stuff in trenches 6" thick layer i/c watering raming to full compaction etc, complete. (PHES-2012, V-III, P-III, P-77, Item-24	4,800 Cft	2760.00	%0 Cft	13,248
14	Providing & Laying & fixinig in trench i/c fitting, jointing and testing etc complete in all respect the high Density Ploythylene PE Pipe (HDPE-100) for W/S confirming ISO 4427/DIN/8074/8075 B.S 3580 & PSI 3051, 250 mm 12" dia (315mm). (PHES-2012, P-28, Vol-III, Part-III, Item-1 PN-16).	400 Rft:	2915.00	P.Rft	1,166,000
Total amount Rs: (in words):-					**4,530,050**

PACKAGE NO: 01

Bill Nr. 03 Construction of Operator Quarters (02 Nos.)

Item No	Description	Qty	Rate	Unit	Amuont
1	Excavation in foundation of building bridges & other structure i/c dag belling dressing refiling around structure with excavated earth watering & refarming lead upto one chain and lift upto5' ft:	2,029 Cft	3176.25	%0 Cft	6,445
2	Cement concrete plaini/c planning compacting finishing and suring complete i/c screening washing of stone aggregate without shuttering 1:3:6	792 Cft	12959.00	% Cft	102,682
3	Pacca brick work in foundation and plinth in cement sand mortar ratio 1:6	776 Cft	11948.36	% Cft	92,680
4	Damp Proof Course with cement sand and shingle concrete 1:2:4 i/c of cost of asphaltic mixture. C) 3" thick	135 Sft	4982.18	% Sft	6,714
5	Pacca brick work in ground floor in cement sand mortar 1:5 (i/c stricking of joints)	1,307 Cft	12674.36	% Cft	165,612
6	Filling watering and ramming earth in floor with surplus earth from foundation lead one chain and lift upto 5'	409 Cft	1512.50	%0 Cft	619
7	Filling watering and ramming earth under floor new earth (Excavated from outside) lead upto one chain and lift upto 5'	200 Cft	3630.00	%0 Cft	725
8	Cement concrete plain i/c placing compacting finishing and curing complete (i/c screening and washing of stone aggregate without shuttering 1:4:8	419 Cft	11288.75	% Cft	47,243
9	Reinforced cement concrete work i/c all labour and material except the cost of steel reinforcement and its labour for bending and binding which will be paid separately. This rate also includes all kinds of forms, molds, lifting shuttering, curing, rendering and finishing and exposed surface (i/c screening and washing of shingle). a) R.C work in roof, slab, beams, columns, rafts, lintels and other structural members laid in site or precast laid in position. i) Ratio 1:2:4 90Lbs: cement sand 4Cft shingle	535 Cft	337.00	P.Cft	180,409

Item No	Description	Qty	Rate	Unit	Amuont
10	Fabrication of milk steel reinforment for cememnt concrete i/c cutting bending laying in position making joints and faslening i/c cost of binding wire and includes removal of rust from bars).	29 Cwt	4820.20	P.Cwt	138,238
11	Cement plastr 1:3 upto 20' height b) ½" thick	1,929 Sft	2344.59	% Sft	45,222
12	Providing and laying 3" thick topping cement concrete (1:2:4) including surface finishing and devidinginto panels.	408 Sft	4411.82	% Sft	18,017
13	Cement poining struck joints on walls b) Ratio 1:3	1,379 Sft	121.58	% Sft	1,677
14	Providing gray cement skirting of dado 3/8" thick i/c rounding of conchers and sthaighling of top edges and finishing to smooth surface after plastering. C) 1:3 Cement sand mortar.	34 Sft	2276.27	% Sft	77,780
15	Providing & fixing in position Doors, windows and vertilator of 2"x2"x1/4" angle iron frame and 1-3/4" thick commercial ply wood veneer shutters of deodar wood (3 ply) on both sides, i/c hold, fasts and one mortics	106 Set	933.75	P.Set	98,978
16	Painting new surface c) Preparing surface and painting of doors and windows any type (i/c edge three coats.	318 Sft	2743.14	% Sft	8,723
17	Primary coat of chalk under distemper	1,929 Sft	442.75	% Sft	8,540
18	Distempering c) three Coats	1,929 Sft	1079.65	% Sft	20,824
19	White washing c) three Coats	295 Sft	829.95	% Sft	2,447
20	Dry Brick of edge paying sand grouted i/c preparation of bed by watering ramming and bringing the same to proper camber by 1/2" mud plaster.	350 Sft	2607.36	% Sft	9,135
21	Barow pit excavation undressed upto 100'. a) Ordinary soil.	1,314 Cft	2117.50	%0 Cft	2,783
22	Grouting 4 1/2" dry brick work with cement mortar ratio 1:5	350 Sft	1002.79	% Sft	3,513

Item No	Description	Qty	Rate	Unit	Amuont
23	Single layer of tiles roofing 9"x4 1/2" laid over 4" earth 1" mud plaster without bhoosa groted with cement sand 1:3 on top of RCC slab provide with 34 Lbs bitument coating sand blinding.	275 Sft	5310.35	% Sft	14,603
24	Khuras of Roof 2'x2'-6"	3 Nos	358.68	Each	1,076
25	Bottom khuras of bricks massonary i/c cement mortar 1:6 ratio 4'x2'x4 1/2" over 3" cement concrete 1:4:8.	3 Nos	649.83	Each	1,949
26	Cost iron rain water down pipe fixed in place excluding heads and shoes but i/c painting and clamp etc. a) 4" dia cost iron down pipe.	32 Rft	423.13	P.Rft	13,540
27	Shoes Bends or off sets for cost iron rain water down pipe i/c fixing and painting.	6 Nos	275.11	Each	1,651
28	Supplying and fixing in position iron steel grill of 3/4"x1/4" size flarte iron of approved design i/c painting 3 coats etc, complete weight not be less than 3.7 Lbs/99ft of	36 Sft	180.50	P.Sft	6,498
29	Providing fixing asquanting tyoe white glazed of flushine cistern with internal fitting & flush pipe with bend and making requisite numbers of holes in was plinth & floor for pipe connections and making good in cement concrete 1:2:4 b) (i) W.C of not less than 19" clear opening between flushing rims and 3 gallons flushing	1 No	4802.60	Each	4,803
30	Providing & fixing a C.I trap with 4" dia intel and 4" dia outlets of the approved slab cleaning design with C.I grating with or without a vent arm i/c cost o making requisite number of holes in walls plinth and floor for pipe connection and making good cement	1 No	1671.58	Each	1,672
31	Providing and fixing 4" dia C.I soil and vent pipe i/c cutting and fitting and extra painting to match the colour of the buildings.	30 Rft	333.29	P.Rft	9,999
32	Providing and fixing M.S clamps of the approved design to 4" dia pipe sockets i/c the cost of cutting and making good to wall of M.S bolts and nuts built 4" wall i/c pipe distance pieces extra painting to match the colour of buildings.	3 Nos	72.16	Each	216

Item No	Description	Qty	Rate	Unit	Amuont
33	Providing and fixing 4"x4"x4" dia C.I branch of the required degree with access doors rubber washer 1/8" thick bolts and nuts and extra painting to match th e colour of	1 No	270.60	Each	271
34	Providing and fixing 4"x4" dia C.I branch of the required degree with excess rubber washer 3/8" thick bolds and nuts and extra painting to match the colour of building	1 No	224.60	Each	225
35	Providing and fixing 4"x4" dia C.I branch of the required degree i/c painting to match the coloure of building.	1 No	201.50	Each	202
36	Providing and fixing 4" dia C.I Terminal guard i/c extra painting to match the colour of	1 No	389.70	Each	390
37	Providing G.I. Pipes, specials & clamps etc i/c fixing cutting and fitting complete with & i/c the cost of braking through walls & roof making god etc: with white sink Zink paint with pigment to match the colure of the building and testing with water to a pressure head of 200 feet and heading i) 1/2" dia G.I Pipe (S.I.No. 2012, Item-1 / P-14)	90 Rft	73.21	P.Rft	6,589
38	Providing G.I Pipes and specials etc i/c fixing cutting and fitting complete with and i/c the cost of the cutting trenches upto 2 1/2" feet deep refilling watering ramming and disposal of surplus earth withing one chain and painting 2 coats of bitumen paint to pipes and special after cleaning and hossion cloth soaked in maxphalt i/c composition warapped light pipes head of 200' and handling ii) 3/4" dia G.Pipe	100 Rft	86.36	P.Rft	8,636
39	Supplying and fixing in position brass bib cock.	3 Nos	299.42	Each	898
40	Providing and fixing fully way gun metal valves with wheels threaded of flanged ends with rubber washer.				
	i) 1/2" dia (Light Pattern)	1 No	134.42	Each	134
	ii) 3/4" dia (Light Pattern)	1 No	197.12	Each	197
	i) 1" dia (Light Pattern)	1 No	260.92	Each	261
41	Providing and laying i/c cutting and fitting C.I pipes in trenches and testing with water to a pressure head of 200 ft.	32 Rft	231.61	P.Rft	7,412

Item No	Description	Qty	Rate	Unit	Amuont
42	Providing and fixing 6"x4" C.C trap with 4" outlet complete with 4" thick 1:2:4 C.C for bed and 1/2" thick cement plaster (1:3) to the kerb C.I grating 6"x6" and C.I over and frame 12"x12" (inside) etc complete. a) C.C Gully trap 6"x4" i) with C.I Cover and frame	1 No	1193.17	Each	1,193
43	Providing R.C.C Pipe with collars class "B" and digging the trenches to required depth and fixing in position i/c cutting fitting and jointing with maxphalt composition and cement mortor 1:1 and testing with water perssure to a head of 4' ft: above the top of the highest pipe and reflign with excavated (a) 6" dia (S.I.No. 2, P-23)V-III, Part- V-B	200 Rft	162.00	P.Rft	32,400
44	Construction mainhole or inspection chamber for the required dia of circular sewer and 3'-6" (1067 mm) depth with walls of B.B in cement mortar 1:3 cement plastered 1:3, 1/2" thick inside of walls and 1" (25 mm) thick over benchinbg and channels i/c fixing C.I manhole cover with frame of clear opening (1 1/2' x 1, 1/2' (457 x 457 mm) of 1.75 Cwt (88.9 kg) embedded in plain C.C 1:2:4 and fixing 1" (25 mm) C.C duly painted etc completed as per specification and drawing No. D.P/I of Public Health Circle Southerrn Zone, (a) 4" to 12" dia 2" x 2" x 3'-6" (S.I.No.	1 No	14748.00	Each	14,748
45	Wiring for light or fan point with 3/.029 PVC insulated wire in 20mm (3/4") PVC conduit recessed in the wall of columns as required. P-15, Item- 124	13 Point	797.00	P.Point	10,361
46	P/F flush type 2 pin 5 amps S.P plug socket switch and shoe unit on prepared board recessed in wall or columns (S.I.No. 11, P-10)	4 Point	83.00	P. Point	332
47	Providing and fixing A.C one way S.P 5amp switch flush type on 1 gien prepared board.	13 Nos	54.00	Each	702
48	Providing and fixing S.W canpoy block and backli ceilling rose on S.W block	8 Nos	98.00	Each	784
49	Providing and fixing metal board to accommodate mains or sub mains switches and for other similar jobs on surface.	12 Sft	932.00	P.Sft	11,184

Item No	Description	Qty	Rate	Unit	Amuont
50	Providing and fixing on prepared board iron clad double pole switch fuse with rewireable fuse link carrier 500 volts, grade 30 amp	3 Nos	1005.00	Each	3,015
51	Providing and fixing mild steel bar fan clamp 15.8mm (5/8") dia suitable fro R.C.C roof	2 Nos	315.00	Each	630
52	Errection of ceilling fan i/c wiring of down rod woth 1/1.13mm (3/029) PVC fixing of regulator blad canopy etc as required	2 Nos	168.00	Each	336
53	Supplying ceilling fans 58" sweep	2 Nos	3185.00	Each	6,370
54	Providing & fixing 1-40 watt tube light complete with 40 walt 4' long rod chowk starter & putty with ohilps componoents i/c necessary electrical connection and fixing wall ceilling etc complete.	4 Nos	496.00	Each	1,984
55	P/F earthing set with 2" x 2"x1x2" copper plate buried in ground at a depth of 12" or less if water comes out from the ground level with salt and charcol, etc i/c making the pit 1/2" deep by excavation of all type of soil earth plate to be connected with No. 8 S.Wg bare copper wire run in 1/2" G.L Pipe trrength from the earth plate upto the metalic electrical accessary i/c providing necessary tee	1 No	5236.00	Each	5,236
56	P/F A.C ceiling fan regulator on S.W.G board.	2 Nos	150.00	Each	300
Total amount for 01 No. Operator Quarter Rs: :-					**1,209,799**
Total Amount for 02 NosOperator Quarter Rs: =		**1,209,799**	**x**	**2 =**	**2,419,599**

*SPECIFIC WORKS DATA

(To be prepared and incorporated by the Procuring Agency)

- Water Table:-
- Soil Condition:-
- Existing Drainage Facilities around the Scheme:
- Total drilled depth of Existing Tubewells:

**(Note: The Procuring Agency shall spell out the information & data required to be filled out by the bidder and to furnish complementary information).*

SCHEDULE – C TO BID

WORKS TO BE PERFORMED BY SUBCONTRACTORS*

The bidder will do the work with his own forces except the work listed below which he intends to sub-contract.

Items of Works to be Sub-Contracted	Name and address of Sub-Contractors	Statement of similar works previously executed. (attach evidence)

Note:

* The Procuring Agency should decide whether to allow subcontracting or not. In case Procuring Agency decides to allow subcontracting then following conditions shall be complied with:

1. No change of Sub-Contractors shall be made by the bidder without prior approval of the Procuring Agency.

2. The truthfulness and accuracy of the statement as to the experience of Sub-Contractors is guaranteed by the bidder. The Procuring Agency's judgment shall be final as to the evaluation of the experience of Sub-Contractors submitted by the bidder.

3. Statement of similar works shall include description, location & value of works, year completed and name & address of the clients.

PROPOSED PROGRAMME OF WORKS

Bidder shall provide a programme in a bar-chart or Program Evaluation and Review Technique (PERT) or Critical Path Method (CPM) showing the sequence of work items by which he proposes to complete the works of the entire Contract. The programme should indicate the sequence of work items and the period of time during which he proposes to complete the works including the activities like designing, schedule of submittal of drawings, ordering and procurement of materials, manufacturing, delivering, construction of civil works, erection, testing and commissioning of works to be supplied under the Contract.

METHOD OF PERFORMING WORKS

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

- The sequence and methods in which he proposes to carry out the Works, including the number of shifts per day and hours per shift, he expects to work.
- A list of all major items of construction and plant erection, tools and vehicles proposed to be used in delivering/carrying out the works at site.
- The procedure for installation of equipment and transportation of equipment and
  materials to the site.
- Organization chart indicating head office & field office personnel involved in management, supervision and engineering of the Works to be done under the Contract.

(INTEGRITY PACT)
DECLARATION OF FEES, COMMISSION AND BROKERAGE ETC PAYABLE BY CONTRACTORS
(FOR CONTRACTS WORTH RS. 10.00 MILLION OR MORE)

Contract No._____ Dated _____

Contract Value: _____

Contract Title: **CONSTRUCTION OF PUMPING STATION (01 NO.), MAKING DIRECT DISPOSAL ARRANGEMENT OF PUMPS FOR PUMPING STATION & CONSTRUCTION OF OPERATOR QUARTERS (02 NOS.)**

..... 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 Sindh (GoS) or any administrative subdivision or agency thereof or any other entity owned or controlled by it (GoS) through any corrupt business practice.

Without limiting the generality of the foregoing, ... 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, from Procuring Agency (PA) except that which has been expressly declared pursuant hereto.

..... accepts full responsibility and strict liability 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 PA and has not taken any action or will not take any action to circumvent the above declaration, representation or warranty.

..... 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 PA under any law, contract or other instrument, be voidable at the option of PA.

Notwithstanding any rights and remedies exercised by PA in this regard,

..... agrees

to indemnify PA for any loss or damage incurred by it on account of its corrupt business practices and further pay compensation to PA in an amount equivalent to ten time the sum of any commission, gratification, bribe, finder's fee

or kickback given by .....

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 PA.

Executive Engineer,
Drainage Division LBOD,
Shaheed Benazirabad

[Procuring Agency]

[Contractor]

CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

CONDITIONS OF CONTRACT

1. GENERAL PROVISIONS

1.1 **Definitions**

In the Contract as defined below, the words and expressions defined shall have the following meanings assigned to them, except where the context requires otherwise:

The Contract

1.1.11 "Contract" means the Contract Agreement and the other documents listed in the Contract Data.

1.1.2 "Specifications" means the document as listed in the Contract Data, including Procuring Agency's requirements in respect of design to be carried out by the Contractor (if any), and any Variation to such document.

1.1.3 "Drawings" means the Procuring Agency's drawings of the Works as listed in the Contract Data, and any Variation to such drawings.

Persons

1.1.4 "Procuring Agency" means the person named in the Contract Data and the legal successors in title to this person, but not (except with the consent of the Contractor) any assignee.

1.1.5 "Contractor" means the person named in the Contract Data and the legal successors in title to this person, but not (except with the consent of the Procuring Agency) any assignee.

1.1.6 "Party" means either the Procuring Agency or the Contractor.

Dates, Times and Periods

1.1.7 "Commencement Date" means the date fourteen (14) days after the date the Contract comes into effect or any other date named in the Contract Data.

1.1.8 "Day" means a calendar day

1.1.9 "Time for Completion" means the time for completing the Works as stated in the Contract Data (or as extended under Sub-Clause 7.3), calculated from the Commencement Date.

Money and Payments

1.1.10 "Cost" means all expenditure properly incurred (or to be incurred) by the Contractor, whether on or off the Site, including overheads and similar charges but does not include any allowance for profit.

Other Definitions

1.1.11 "Contractor's Equipment" means all machinery, apparatus and other things required for the execution of the Works but does not include Materials or Plant intended to form part of the Works.

1.1.12 "Country" means the Islamic Republic of Pakistan.

1.1.13 "Procuring Agency's Risks" means those matters listed in Sub-Clause 6.1.

1.1.14 "Force Majeure" means an event or circumstance which makes performance of a Party's obligations illegal or impracticable and which is beyond that Party's reasonable control.

1.1.15 "Materials" means things of all kinds (other than Plant) to be supplied and incorporated in the Works by the Contractor.

1.1.16 "Plant" means the machinery and apparatus intended to form or forming part of the Works.

1.1.17 "Site" means the places provided by the Procuring Agency where the Works are to be executed, and any other places specified in the Contract as forming part of the Site.

1.1.18 "Variation" means a change which is instructed by the Engineer/Procuring Agency under Sub-Clause 10.1.

1.1.19 "Works" means any or all the works whether Supply, Installation, Construction etc. and design (if any) to be performed by the Contractor including temporary works and any variation thereof.

1.1.20 "Engineer" means the person notified by the Procuring Agency to act as Engineer for the purpose of the Contract and named as such in Contract Data.

1.2 Interpretation

Words importing persons or parties shall include firms and organizations. Words importing singular or one gender shall include plural or the other gender where the context requires.

1.3 Priority of Documents

The documents forming the Contract are to be taken as mutually explanatory of one another. If an ambiguity or discrepancy is found in the documents, the priority of the documents shall be in accordance with the order as listed in the Contract Data.

1.4 Law

The law of the Contract is the relevant Law of Islamic Republic of Pakistan.

1.5 Communications

All Communications related to the Contract shall be in English language.

1.6 **Statutory Obligations**

The Contractor shall comply with the Laws of Islamic Republic of Pakistan and shall give all notices and pay all fees and other charges in respect of the Works.

2. THE PROCURING AGENCY

2.1 **Provision of Site**

The Procuring Agency shall provide the Site and right of access thereto at the times stated in the Contract Data.
Site Investigation Reports are those that were included in the bidding documents and are factual and interpretative reports about the surface and subsurface conditions at the Site.

2.2 **Permits etc.**

The Procuring Agency shall, if requested by the Contractor, assist him in applying for permits, licences or approvals which are required for the Works.

2.3 **Engineer's/Procuring Agency's Instructions**

The Contractor shall comply with all instructions given by the Procuring Agency or the Engineer, if notified by the Procuring Agency, in respect of the Works including the suspension of all or part of the works.

2.4 **Approvals**

No approval or consent or absence of comment by the Engineer/Procuring Agency shall affect the Contractor's obligations.

3. ENGINEER'S/PROCURING AGENCY'S REPRESENTATIVES

3.1 **Authorised Person**

The Procuring Agency shall appoint a duly authorized person to act for him and on his behalf for the purposes of this Contract. Such authorized person shall be duly identified in the Contract Data or otherwise notified in writing to the Contractor as soon as he is so appointed. In either case the Procuring Agency shall notify the Contractor, in writing, the precise scope of the authority of such authorized person at the time of his appointment.

Assistant Executive Engineer will act on behal of Executive Engineer / Procuring Agency.

3.2 **Engineer's/Procuring Agency's Representative**

The name and address of Engineer's/Procuring Agency's Representative is given in Contract Data. However the Contractor shall be notified by the Engineer/Procuring Agency, the delegated duties and authority before the Commencement of works.

4. THE CONTRACTOR

4.1 General Obligations

The Contractor shall carry out the works properly and in accordance with the Contract. The Contractor shall provide all supervision, labour, Materials, Plant and Contractor's Equipment which may be required

4.2 Contractor's Representative

The Contractor shall appoint a representative at site on full time basis to supervise the execution of work and to receive instructions on behalf of the Contractor but only after obtaining the consent of the Procuring Agency for such appointment which consent shall not be withheld without plausible reason(s) by the Procuring Agency. Such authorized representative may be substituted/ replaced by the Contractor at any time during the Contract Period but only after obtaining the consent of the Procuring Agency as aforesaid.

4.3 Subcontracting

The Contractor shall not subcontract the whole of the works. The Contractor shall not subcontract any part of the works without the consent of the Procuring Agency.

4.4 Performance Security

The Contractor shall furnish to the Procuring Agency within fourteen (14) days after receipt of Letter of Acceptance a Performance Security at the option of the bidder, in the form of Payee's order /Bank Draft or Bank Guarantee from scheduled bank for the amount and validity specified in Contract Data. (DELETED)

5. DESIGN BY CONTRACTOR

5.1 Contractor's Design

The Contractor shall carry out design to the extent specified, as referred to in the Contract Data. The Contractor shall promptly submit to the Engineer/Procuring Agency all designs prepared by him, within fourteen (14) days of receipt the Engineer/Procuring Agency shall notify any comments or, if the design submitted is not in accordance with the Contract, shall reject it stating the reasons.

Contractor shall not construct any element of the works designed by him within fourteen (14) days after the design has been submitted to the Engineer/Procuring Agency or which has been rejected. Design that has been rejected shall be promptly amended and resubmitted. The Contractor shall resubmit all designs commented on taking these comments into account as necessary.

5.2 **Responsibility for Design**

The Contractor shall remain responsible for his bided design and the design under this Clause, both of which shall be fit for the intended purposes defined in the Contract and he shall also remain responsible for any infringement of any patent or copyright in respect of the same. The Engineer/Procuring Agency shall be responsible for the Specifications and Drawings.

6. PROCURING AGENCY'S RISKS

6.1 **The Procuring Agency's Risks**

The Procuring Agency's Risks are:-

a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies, within the Country;

b) Rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war, within the Country;

c) riot, commotion or disorder by persons other than the Contractor's personnel and other employees including the personnel and employees of Sub-Contractors, affecting the Site and/or the Works;

d) ionising radiations, or contamination by radio-activity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radio-active toxic explosive, or other hazardous properties of any explosive nuclear assembly or nuclear component of such an assembly, except to the extent to which the Contractor/Sub-Contractors may be responsible for the use of any radio-active material;

e) Pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds;

f) use or occupation by the Procuring Agency of any part of the Works, except as may be specified in the Contract;

g) late handing over of sites, anomalies in drawings, late delivery of designs and drawings of any part of the Works by the Procuring Agency's personnel or by others for whom the Procuring Agency is responsible;

h) a suspension under Sub-Clause 2.3 unless it is attributable to the Contractor's failure; and

i) physical obstructions or physical conditions other than climatic conditions, encountered on the Site during the performance of the Works, for which the Contractor immediately notified to the Procuring Agency and accepted by the Procuring Agency.

7. TIME FOR COMPLETION

7.1 Execution of the Works

The Contractor shall commence the Works on the Commencement Date and shall proceed expeditiously and without delay and shall complete the Works, subject to Sub-Clause 7.3 below, within the Time for Completion.

7.2 Programme

Within the time stated in the Contract Data, the Contractor shall submit to the Engineer/Procuring Agency a programme for the Works in the form stated in the Contract Data.

7.3 Extension of Time

The Contractor shall, within such time as may be reasonable under the circumstances, notify the Procuring Agency/Engineer of any event(s) falling within the scope of Sub-Clause 6.1 or 10.3 of these Conditions of Contract and request the Procuring Agency/Engineer for a reasonable extension in the time for the completion of works. Subject to the aforesaid, the Procuring Agency/Engineer shall determine such reasonable extension in the time for the completion of works as may be justified in the light of the details/particulars supplied by the Contractor in connection with the such determination by the Procuring Agency/Engineer within such period as may be prescribed by the Procuring Agency/Engineer for the same; and the Procuring Agency may extend the time for completion as determined.

7.4 Late Completion

If the Contractor fails to complete the Works within the Time for Completion, the Contractor's only liability to the Procuring Agency for such failure shall be to pay the amount as liquidity damages stated in the Contract Data for each day for which he fails to complete the Works.

8. TAKING-OVER

8.1 Completion

The Contractor may notify the Engineer/Procuring Agency when he considers that the Works are complete.

8.2 Taking-Over Notice

Within fourteen (14) days of the receipt of the said notice of completion from the Contractor the Procuring Agency/Engineer shall either takeover the completed works and issue a Certificate of Completion to that effect or shall notify the Contractor his reasons for not taking-over the works. While issuing the Certificate of Completion as aforesaid, the Procuring Agency/Engineer may identify any outstanding items of work which the Contractor shall undertake during the Maintenances Period.

9. REMEDYING DEFECTS

9.1 Remedying Defects

The Contractor shall for a period stated in the Contract Data from the date of issue of the Certificate of Completion carry out, at no cost to the Procuring Agency, repair and rectification work which is necessitated by the earlier execution of poor quality of work or use of below specifications material in the execution of Works and which is so identified by the Procuring Agency/Engineer in writing within the said period. Upon expiry of the said period, and subject to the Contractor's faithfully performing his aforesaid obligations, the Procuring Agency/Engineer shall issue a Maintenance Certificate whereupon all obligations of the Contractor under this Contract shall come to an end.

Failure to remedy any such defects or complete outstanding work within a reasonable time shall entitle the Procuring Agency to carry out all necessary works at the Contractor's cost. However, the cost of remedying defects not attributable to the Contractor shall be valued as a Variation.

9.2 Uncovering and Testing

The Engineer/Procuring Agency may give instruction as to the uncovering and/or testing of any work. Unless as a result of an uncovering and/or testing it is established that the Contractor's design, materials, plant or workmanship are not in accordance with the Contract, the Contractor shall be paid for such uncovering and/or testing as a Variation in accordance with Sub-Clause 10.2.

10. VARIATIONS AND CLAIMS

10.1 Right to Vary

The Procuring Agency/Engineer may issue Variation Order(s) in writing. Where for any reason it has not been possible for the Procuring Agency/Engineer to issue such Variations Order(s), the Contractor may confirm any verbal orders given by the Procuring Agency/Engineer in writing and if the same are not refuted/denied by the Procuring Agency/Engineer within ten (10) days of the receipt of such confirmation the same shall be deemed to be a Variation Orders for the purposes of this Sub-Clause.

10.2 Valuation of Variations

Variations shall be valued as follows:

a) at a lump sum price agreed between the Parties, or

b) where appropriate, at rates in the Contract, or

c) in the absence of appropriate rates, the rates in the Contract shall be used as the basis for valuation, or failing which

d) at appropriate new rates, as may be agreed or which the Engineer/Procuring Agency considers appropriate, or

e) if the Engineer/Procuring Agency so instructs, at day work rates set out in the Contract Data for which the Contractor shall keep records of hours of labour and Contractor's Equipment, and of Materials, used.

10.3 Changes in the Quantities.

a) If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than 25 percent, provided the change exceeds 1 percent of the Initial Contract Price, the Procuring Agency/Engineer shall adjust the rate to allow for the change and will be valued as per sub clause 10.2.

b) The Engineer shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent, except with the prior approval of the Procuring Agency.

c) If requested by the Engineer, the contractor shall provide the Engineer with a detailed cost breakdown of any rate in the Bill of Quantities.

10.4 Early Warning

The Contractor shall notify the Engineer/Procuring Agency in writing as soon as he is aware of any circumstance which may delay or disrupt the Works, **No will be made.**

To the extent of the Contractor's failure to notify, which results to the Engineer/Procuring Agency being unable to keep all relevant records or not taking steps to minimise any delay, disruption, or Cost, or the value of any Variation, the Contractor's entitlement to extension of the Time for Completion or additional payment shall be reduced/rejected.

10.5 Valuation of Claims

If the Contractor incurs Cost as a result of any of the Procuring Agency's Risks, the Contractor shall not be entitled to the amount of such Cost. If as a result of any Procuring Agency's Risk, it is necessary to change the Works, this shall be dealt with as a no Variation subject to Contractor's notification for intention of claim to the Engineer/Procuring Agency.

10.6 Variation and Claim Procedure

The Contractor shall submit to the Engineer/Procuring Agency an itemised detailed breakdown of the value of variations and claims within twenty eight (28) days of the instruction or of the event giving rise to the claim. The Engineer/Procuring Agency shall check and if possible agree the value. In the absence of agreement, the Procuring Agency shall determine the value.

11. CONTRACT PRICE AND PAYMENT

11.1 (a) Terms of Payments

The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other terms of the Contract, shall , subject to Clause 11.3, be paid by the Procuring.

Agency to the Contractor within 30 days after such Interim Payment Certificate has been jointly verified by Procuring Agency and Contractor, or, in the case of the Final Certificate referred to in Sub Clause 11.5, within 60days after such Final Payment Certificate has been jointly verified by Procuring Agency and Contractor; the payment shall be made to contractor subject to availability of funds.

(a) Valuation of the Works
The Works shall be valued as provided for in the Contract Data, subject to Clause 10.

11.2 Monthly Statements

The Contractor shall be entitled to be paid at monthly intervals:

a) the value of the Works executed less to the cumulative amount paid previously; and

b) value of secured advance on the materials and valuation of variations (if any).

The Contractor shall submit each month to the Engineer/Procuring Agency a statement showing the amounts to which he considers himself entitled.

11.3 Interim Payments

Within a period not exceeding seven (07) days from the date of submission of a statement for interim payment by the Contractor, the Engineer shall verify the same and within a period not exceeding thirty (30/60) days from the said date of submission by the Contractor, the Procuring Agency shall pay to the Contractor the sum subject to adjustment for deduction of the advance payments and retention money.

11.4 Retention

Retention money shall be paid by the Procuring Agency to the Contractor within Ninety (90) days after either the expiry of the period stated in the Contract Data, or the remedying of notified defects, or the completion of outstanding work, all as referred to in Sub-Clause 9.1, whichever is the later.

11.5 Final Payment

Within twenty one (21) days from the date of issuance of the Maintenance Certificate the Contractor shall submit a final account to the Assistant Executive Engineer to verify and the Assistant Executive Engineer shall verify the same within fourteen (14) days from the date of submission and forward the same to the Procuring Agency together with any documentation reasonably required to enable the Procuring Agency to ascertain the final contract value.

On availability of funds receipt of the verified final account from the Assistant Executive, the Procuring Agency shall pay to the Contractor any amount due to the Contractor. While making such payment the Procuring Agency may, for

reasons to be given to the Contractor in writing, with held any part or parts of the verified amount.

11.6 Currency

Payment shall be in the currency Pak Rupees.

12. DEFAULT

12.1 Defaults by Contractor

If the Contractor abandons the Works, refuses or fails to comply with a valid instruction of the Engineer/Procuring Agency or fails to proceed expeditiously and without delay, or is, despite a written complaint, in breach of the Contract, the Procuring Agency may give notice referring to this Sub-Clause and stating the default.
If the Contractor has not taken all practicable steps to remedy the default within fourteen (14) days after receipt of the Procuring Agency's notice, the Procuring Agency may by a second notice given within a further twenty one (21) days, terminate the Contract. The Contractor shall then demobilize from the Site leaving behind any Contractor's Equipment which the Procuring Agency instructs, in the second notice, to be used for the completion of the Works at the risk and cost of the Contractor.

12.2 Defaults by Procuring Agency

If the Procuring Agency fails to pay in accordance with the Contract, or is, despite a written complaint, in breach of the Contract, the Contractor may give notice referring to this Sub-Clause and stating the default. If the default is not remedied within fourteen (14) days after the Procuring Agency's receipt of this notice, the Contractor may suspend the execution of all or parts of the Works.

NOT APPLICABLE

If the default is not remedied within twenty eight (28) days after the Procuring Agency's receipt of the Contractor's notice, the Contractor may by a second notice given within a further twenty one (21) days, terminate the Contract. The Contractor shall then demobilise from the Site.

12.3 Insolvency

If a Party is declared insolvent under any applicable law, the other Party may by notice terminate the Contract immediately. The Contractor shall then demobilise from the site leaving behind, in the case of the Contractor's insolvency, any Contractor's Equipment which the Procuring Agency instructs in the notice is to be used for the completion of the Works.

12.4 Payment upon Termination

After termination, the Contractor shall be entitled to payment of the unpaid balance of the value of the works executed and of the Materials and Plant reasonably delivered to the site, adjusted by the following:

a) any sums to which the Contractor is entitled under Sub-Clause 10.4,

b) any sums to which the Procuring Agency is entitled,

c) if the Procuring Agency has terminated under Sub-Clause 12.1 or 12.3, the Procuring Agency shall be entitled to a sum equivalent to twenty percent (20%) of the value of parts of the Works not executed at the date of the termination, and

d) if the Contractor has terminated under Sub-Clause 12.2 or 12.3, the Contractor shall be entitled to the cost of his demobilisation together with a sum equivalent to ten percent (10%) of the value of parts of the works not executed at the date of termination.

The net balance due shall be paid or repaid within twenty eight (28) days of the notice of termination.

13. RISKS AND RESPONSIBILITIES

13.1 Contractor's Care of the Works

Subject to Sub-Clause 9.1, the Contractor shall take full responsibility for the care of the Works from the Commencement Date until the date of the Procuring Agency's/Engineer's issuance of Certificate of Completion under Sub-Clause 8.2. Responsibility shall then pass to the Procuring Agency. If any loss or damage happens to the Works during the above period, the Contractor shall rectify such loss or damage so that the Works conform with the Contract.

Unless the loss or damage happens as a result of any of the Procuring Agency's Risks, the Contractor shall indemnify the Procuring Agency, or his agents against all claims loss, damage and expense arising out of the Works.

13.2 Force Majeure

If Force Majeure occurs, the Contractor shall notify the Engineer/Procuring Agency immediately. If necessary, the Contractor may suspend the execution of the Works and, to the extent agreed with the Procuring Agency demobilize the Contractor's Equipment.

If the event continues for a period of eighty four (84) days, either Party may then give notice of termination which shall take effect twenty eight (28) days after the giving of the notice.

After termination, the Contractor shall be entitled to payment of the unpaid balance of the value of the Works executed and of the Materials and Plant reasonably delivered to the Site, adjusted by the following:

a) any sums to which the Contractor is entitled under Sub-Clause 10.4,

b) the cost of his demobilization, and

c) less any sums to which the Procuring Agency is entitled.

The net balance due shall be paid or repaid within thirty five (35) days of the notice of termination.

14. INSURANCE

14.1 Arrangements

The Contractor shall, prior to commencing the Works, effect insurances of the types, in the amounts and naming as insured the persons stipulated in the Contract Data except for items (a) to (e) and (i) of the Procuring Agency's Risks under Sub-Clause 6.1. The policies shall be issued by insurers and in terms approved by the Procuring Agency. The Contractor shall provide the Engineer/Procuring Agency with evidence that any required policy is in force and that the premiums have been paid.

14.2 Default

If the Contractor fails to effect or keep in force any of the insurances referred to in the previous Sub-Clause, or fails to provide satisfactory evidence, policies or receipts, the Procuring Agency may, without prejudice to any other right or remedy, effect insurance for the cover relevant to such as a default and pay the premiums due and recover the same plus a sum in percentage given in Contractor Data from any other amounts due to the Contractor.

15. RESOLUTION OF DISPUTES

15.1 Engineer's Decision

If a dispute of any kind whatsoever arises between the Procuring Agency and the Contractor in connection with the works, the matter in dispute shall, in the first place, be referred in writing to the Engineer, with a copy to the other party. Such reference shall state that it is made pursuant to this Clause. No later than the twenty eight (28) days after the day on which he received such reference, the Engineer shall give notice of his decision to the Procuring Agency (Superintending Engineer) and the Contractor.

Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the work with all due diligence, and the Contractor and the Procuring Agency (Superintending Engineer)shall give effect forthwith to every such decision of the Engineer unless and until the same shall be revised, as hereinafter provided in an arbitral award.

15.2 Notice of Dissatisfaction

If a Party is dissatisfied with the decision of the Engineer of consultant or if no decision is given within the time set out in Sub-Clause 15.1 here above, the Party may give notice of dissatisfaction referring to this Sub-Clause within fourteen (14) days of receipt of the decision or the expiry of the time for the decision. If no notice of dissatisfaction is given within the specified time, the decision shall be final and binding on the Parties. If notice of dissatisfaction is given within the specified time, the decision shall be binding

on the Parties who shall give effect to it without delay unless and until the decision of the Engineer is revised by an arbitrator.

If a contractor is dissatisfied with the decision of the Engineer of the department or decision is not given in time then he can approach Superintending Engineer within 14 days, in case of dissatisfaction with decision of Superintending Engineer or not decided within 28 days, then arbitration process would be adopted as per clause 15.3.

15.3 **Arbitration**

A dispute which has been the subject of a notice of dissatisfaction shall be finally settled as per provisions of Arbitration Act 1940 (Act No. X of 1940) and Rules made there under and any statutory modifications thereto. Any hearing shall be held at the place specified in the Contract Data and in the language referred to in Sub-Clause 1.5.

16. INTEGRITY PACT

16.1 If the Contractor or any of his Sub-Contractors, agents or servants is found to have violated or involved in violation of the Integrity Pact signed by the Contractor as Schedule-F to his Bid, then the Procuring Agency 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 Sub-Contractors, agents or servants;

(b) terminate the Contract; and

(c) recover from the Contractor any loss or damage to the Procuring Agency as a result of such termination or of any other corrupt business practices of the Contractor or any of his Sub-Contractors, agents or servants.

On termination of the Contract under Sub-Para (b) of this Sub-Clause, the Contractor shall demobilize from the site leaving behind Contractor's Equipment which the Procuring Agency instructs, in the termination notice, to be used for the completion of the works at the risk and cost of the Contractor. Payment upon such termination shall be made under Sub-Clause 12.4, in accordance with Sub-Para (c) thereof, after having deducted the amounts due to the Procuring Agency under Sub-Para (a) and (c) of this Sub-Clause.

CONTRACT DATA

Sub-Clauses of
Conditions of Contract
1.1.3 Procuring Agency's Drawings, if any
(To be listed by the Procuring Agency)

1.1.4 The Procuring Agency means

Executive Engineer

1.1.5 The Contractor means

Bidder

1.1.7 Commencement Date means the date of issue of Engineer's Notice to Commence which shall be issued within fourteen (14) days of the signing of the Contract Agreement.

1.1.9 Time for Completion **25 Months**
(The time for completion of the whole of the Works should be assessed by the Procuring Agency)

1.1.20 Engineer (mention the name along with the designation including whether he belongs to department or consultant) and other details

Concurrent
Assistant Executive Engineer
Drainage Sub-Division

1.3 **Documents forming the Contract listed in the order of priority:**

(a) The Contract Agreement
(b) Letter of Acceptance
(c) The completed Form of Bid
(d) Contract Data
(e) Conditions of Contract
(f) The completed Schedules to Bid including Schedule of Prices
(g) The Drawings, if any
(h) The Specifications
(i) _____
(j) _____

(The Procuring Agency may add, in order of priority, such other documents as form part of the Contract. Delete the document, if not applicable)

2.1 Provision of Site: On the Commencement Date

3.1 Authorized person: **Concurrent**
Assistant Executive Engineer
Drainage Sub-Division

3.2 Name and address of Engineer's/Procuring Agency's representative
_____

4.4 Performance Security:
Amount_____
Validity_____
(Form: As provided under Standard Forms of these Documents)

NOT APPLICABLE

5.1 Requirements for Contractor's design (if any):
Specification Clause No's_____

7.2 Programme:
Time for submission: Within fourteen (14) days* of the Commencement Date.
Form of programme: **Bar Chart indemnifying the critical activities.**

7.4 Amount payable due to failure to complete shall be **0.05%** per day up to a maximum of 10%) of sum stated in the Letter of Acceptance
(Usually the liquidated damages are set between 0.05 percent and 0.10 percent per day.)

7.5 Early Completion

In case of earlier completion of the work, the Contractor is entitled to be paid bonus up-to limit and at a rate equivalent to 50% of the relevant limit and rate of liquidated damages stated in the contract data.

NOT APPLICABLE

9.1 Period for remedying defects

03 Months

10.2 (e) Variation procedures:

Day work rates **in Quantities revised approved by the competent authority.**

11.1 Terms of Payments

a) Mobilization Advance

(1) Mobilization Advance up to 10% of the Contract Price stated in the Letter of Acceptance shall be paid by the Procuring Agency to the Contractor on the works costing Rs.2.5 million or above on following conditions:

NOT APPLICABLE

(i) on submission by the Contractor of a Mobilization Advance Guarantee for the full amount of the Advance in the specified form from a Scheduled Bank in Pakistan to the Procuring Agency;

(ii) Contractor will pay interest on the mobilization advance at the rate of 10% per annum on the advance; and

(viii) This Advance including the interest shall be recovered in 5 equal installments from the five (05) R.A bills and in case the number of bills is less than five (05) then 1/5th of the advance inclusive of the interest thereon shall be recovered from each bill and the balance together with interest be recovered from the final bill. It may be insured that there is sufficient amount in the final bill to enable recovery of the Mobilization Advance.

NOT APPLICABLE

OR

2) Secured Advance on Materials

(a) The Contractor shall be entitled to receive from the Procuring Agency Secured Advance against an INDENTURE BOND in P W Account Form No. 31(Fin. R. Form No. 2 acceptable to the Procuring Agency of such sum as the Engineer may consider proper in respect of non-perishable materials brought at the Site but not yet incorporated in the Permanent Works provided that:

(i) The materials are in accordance with the Specifications for the Permanent Works;

(ii) Such materials have been delivered to the Site and are properly stored and protected against loss or damage or deterioration to the satisfaction and verification of the Engineer but at the risk and cost of the Contractor;

NOT APPLICABLE

(iii) The Contractor's records of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer, and such records shall be available for inspection by the Engineer;

(iv) The Contractor shall submit with his monthly statement the estimated value of the materials on Site together with such documents as may be required by the Engineer for the purpose of valuation of materials and providing evidence of ownership and payment therefore;

(v) Ownership of such materials shall be deemed to vest in the Procuring Agency and these materials shall not be removed from the Site or otherwise disposed of without written permission of the Procuring Agency;

(vi) The sum payable for such materials on Site shall not exceed 75 % of the (i) landed cost of imported materials, or (ii) ex-factory / ex-warehouse price of locally manufactured or produced materials, or

(iii) market price of stands other materials;

(vii) Secured Advance should not be allowed unless & until the previous advance, if an, fully recovered;

(viii) Detailed account of advances must be kept in part II of running account bill; and

(ix) Secured Advance may be permitted only against materials/quantities anticipated to be consumed / utilized on the work within a period of 3 months from the date of issue of secured advance and definitely not for full quantities of materials for the entire work/contract

(b) Recovery of Secured Advance:

(i) Secured Advance paid to the Contractor under the above provisions shall be effected from the monthly payments on actual consumption basis, but not later than period specified in the rules not more than three months (even if unutilized); other conditions.

(ii) As recoveries are made the outstanding accounts of the items concerned in Part II should be reduced b making deduction entries in the column; "deduct quantity utilized in work measured since previous bill,I equivalent to the quantities of materials used by the contractor on items of work shown as executed in part I of the bill.

(c) Interim payments: The Contractor shall submit to the Engineer monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

(i) The value of work completed comprises the value of the quantities of the items in the Bill of Quantities completed.

(ii) value of secured advance on the materials and valuation of variations (if any).

(iii) Engineer may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

(v) Retention money and other advances are to be recovered from the bill submitted by contractor.

11.2 *(a) Valuation of the Works:

i) Lump sum price_____(details), or
ii) Lump sum price with schedules of rates _____ (details), or
iii) Lump sum price with bill of quantities_____(details), or
iv) Re-measurement with estimated/bid quantities in the Schedule of Prices or on premium above or below quoted on the rates mentioned in CSR _____(details), or/and

v) Cost reimbursable_____(details)

11.3 Percentage of retention*: five (5%)

11.6 Currency of payment: Pak. Rupees

14.1 **Insurances:** (Procuring Agency may decide, keeping in view the nature and the scope of the work)

Type of cover

The Works

Amount of cover

The sum stated in the Letter of Acceptance plus fifteen percent (15%)

Type of cover

Contractor's Equipment:

Amount of cover

Full replacement cost

Type of cover

Third Party-injury to persons and damage to property

_____

(The minimum amount of third party insurance should be assessed by the Procuring Agency and entered).

Workers:

_____

_____

Other cover*:

_____

(In each case name of insured is Contractor and Procuring Agency)

14.2 Amount to be recovered

Premium plus _____ percent (____%).

15.3 Arbitration**

Place of Arbitration:_____

---

* (Procuring Agency to specify as appropriate)

** (It has to be in the Province of Sindh)

STANDARD FORMS

(Note: Standard Forms provided in this document for securities are to be issued by a bank. In case the bidder chooses to issue a bond for accompanying his bid or performance of contract or receipt of advance, the relevant format shall be tailored accordingly without changing the spirit of the Forms of securities).

FORM OF BID SECURITY
(Bank Guarantee)

Guarantee No._____

Executed on _____

(Letter by the Guarantor to the Procuring Agency)

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

Name of Principal (Bidder) with

address:_____

_____

Sum of Security (express in words and

figures):_____

_____

Bid Reference No._____ Date of Bid _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal, we the Guarantor above-named are held and firmly bound unto the _____, (hereinafter called The "Procuring Agency") 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 Principal has submitted the accompanying Bid numbered and dated as above for **CONSTRUCTION OF PUMPING STATION (01 NO.), MAKING DIRECT DISPOSAL ARRANGEMENT OF PUMPS FOR PUMPING STATION & CONSTRUCTION OF OPERATOR QUARTERS (02 NOS.)** (Particulars of Bid) to the said Procuring Agency; and

WHEREAS, the Procuring Agency has required as a condition for considering the said Bid that the Principal furnishes a Bid Security in the above said sum to the Procuring Agency,
conditioned as under:

(1) that the Bid Security shall remain valid for a period of Ninety (90) days beyond the period of validity of the bid;
(2) that in the event of;

(a) the Principal withdraws his Bid during the period of validity of Bid, or

(b) the Principal does not accept the correction of his Bid Price, pursuant to Sub-Clause 16.4 (b) of Instructions to Bidders, or

(c) failure of the successful bidder to

(i) furnish the required Performance Security, in accordance with Sub-Clause IB-21.1 of Instructions to Bidders, or

(ii) sign the proposed Contract Agreement, in accordance with Sub-Clauses IB-20.2 & 20.3 of Instructions to Bidders,

the entire sum be paid immediately to the said Procuring Agency for delayed completion and not as penalty for the successful bidder's failure to perform.

NOW THEREFORE, if the successful bidder shall, within the period specified therefore, on the prescribed form presented to him for signature enter into a formal Contract Agreement with the said Procuring Agency in accordance with his Bid as accepted and furnish within fourteen (14) days of receipt of Letter of Acceptance, a Performance Security with good and sufficient surety , as may be required, upon the form prescribed by the said Procuring Agency 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 then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

PROVIDED THAT the Guarantor shall forthwith pay to the Procuring Agency the said sum stated above upon first written demand of the Procuring Agency without cavil or argument and without requiring the Procuring Agency to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Procuring Agency by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Procuring Agency shall be the sole and final judge for deciding whether the Principal 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 Guarantor shall pay without objection the sum stated above upon first written demand from the Procuring Agency forthwith and without any reference to the Principal or any other person.

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

_____
Guarantor (Bank)

Witness:

1. _____

_____
Corporate Secretary (Seal)

2. _____

_____
(Name, Title & Address)

1. Signature_____

2. Name _____

3. Title _____

Corporate Guarantor (Seal)

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the —Agreement) made on the _____ day of **2015 in** between **Executive Engineer Drainage Division LBOD Shaheed Benazirabad** of the one part and **M/S** _____ (hereinafter called the "Contractor") of the other part.

WHEREAS the Procuring Agency is desirous that certain Works, viz **"Removing Deficiencies & Construction of Remaining Works of Phull Daulatpur Drainage Scheme, District Naushahroferoze" (ADP No. 1015/2014-15)** should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement witnesseth as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the Conditions of Contract hereinafter referred to.

2. The following documents after incorporating addenda, 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, viz:

(a) The Letter of Acceptance;
(b) The completed Form of Bid along with Schedules to Bid;
(c) Conditions of Contract & Contract Data;
(d) The priced Schedule of Prices/Bill of quantities (BoQ);
(e) The Specifications; and
(f) The Drawings

3. In consideration of the payments to be made by the Procuring Agency to the Contractor as hereinafter mentioned, the Contractor hereby covenants with the Procuring Agency to execute and complete the Works and remedy defects therein in conformity and in all respects within the provisions of the Contract.

4. The Procuring Agency 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 Contract Agreement to be executed on the day, month and year first before written in accordance with their respective laws.

Signature of the Contactor

_____

(Seal)

Signature of the Procuring Agency

_____

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

_____

(Name, Title and Address)

Witness:

_____

(Name, Title and Address)

MOBILIZATION ADVANCE GUARANTEE

Guarantee No._____
Executed on_____

(Letter by the Guarantor to the Procuring Agency)

WHEREAS the _____ (hereinafter called the Procuring Agency) has entered into a Contract for _____

_____

_____ (Particulars of Contract), with _____ (hereinafter called the Contractor).

AND WHEREAS the Procuring Agency has agreed to advance to the Contractor, at the Contractor's request, an amount of Rs._____ Rupees _____) which amount shall be advanced to the Contractor as per provisions of the Contract.

AND WHEREAS the Procuring Agency has asked the Contractor to furnish Guarantee to secure the advance payment for the performance of his obligations under the said Contract.

AND WHEREAS _____ (Scheduled Bank) (hereinafter called the Guarantor) at the request of the Contractor and in consideration of the Procuring Agency 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 fulfillment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Procuring Agency for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Procuring Agency shall be the sole and final

judge, as aforesaid, on the part of the Contractor, shall be given by the Procuring Agency 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 come into force as soon as the advance payment has been credited to the account of the Contractor.

This Guarantee shall expire not later than _____ by which date we must have received any claims by registered letter, telegram, telex or telefax.

It is understood that you will return this Guarantee to us on expiry or after settlement of the total amount to be claimed hereunder.

_____
Guarantor (Scheduled Bank)

Witness:

1. _____

_____
Corporate Secretary (Seal)

2. _____

_____
(Name, Title & Address)

1. Signature _____

2. Name _____

3. Title _____

_____
Corporate Guarantor (Seal)

INDENTURE FOR SECURED ADVANCES.

(For use in cases in which is contract is for finished work and the contractor has entered into an agreement for the execution of a certain specified quantity of work in a given time).

This INDENTURE made the .... day of ..... -197--"- BETWEEN (hereinafter called "the Contractor" which expression shall where the context so admits or implied be deemed to include his heirs, executors, administrators and assigns) of the one part and THE GOVERNOR OF SINDH (hereinafter called "the Government" of the other part).

WHEREAS by an agreement, dated (hereinafter called the said agreement, the contractor has agreed to perform the under-mentioned works (hereinafter referred to as the said work):-

(Here enter (the description of the works).

AND WHEREAS the contractor has applied to the ....---- for an advance to him of Rupees ---------- (Rs. .....) on the security of materials absolutely belonging to him and brought by him to the site of the said works the subject of the said agreement for use in the construction of such of the said works as he has undertaken to execute at rates fixed for the finished work (inclusive of the cost of materials and labour and other charge) AND

WHEREAS the Government has agreed to advance to the Contractor the sum of Rupees, (Rs. .....) on the security of materials the quantities and other particulars of which are detailed in Part II of Running Account Bill (E). the said works signed by the contractor Fin R.Form.17.A

on ---------- ..... — and on such covenants and conditions as are hereinafter contained and the Government has reserved to itself the option of marking any further advance or advances on the security of other materials brought by the Contractor to the site of the said works.

NOW THIS INDENTURE WTTNESSETH that in pursuance of the said agreement and in consideration of the sum of Rupees ..... ---------- ..... - ..... — ..... (Rs. ------ .....) on or before the execution of these presents paid to the Contractor by the Government (the receipt whereof the Contractor doth hereby acknowledge) and of such further advances (if any) as may be made to him as aforesaid (all of which advances are hereinafter collectively referred to as the said amount) the Contractor doth hereby assign unto the Government the said materials by way of security for the said amount

And doth hereby covenant and agree with the Government and declare ay follow

:-

(1) That the said sum of Rupees ..... - ..... ---------- ..... --------RF.- ----------) so advanced by the Government to the Contractor as aforesaid and

all or any further sum or sums which may be advanced aforesaid shall be employed by the contractor in or towards expending the execution of the said works and for no other purpose whatsoever.

(2) That the materials detailed in the said Running Account Bill (B) which have been Fin R Form No. 17-A

Offered to and accepted by (he Government as security for the said amount are absolutely by the Contractors own property free from encumbrances of any kind and the Contractor will not make any application for or receive a further advance on the security of materials which are not absolutely his own property and free from encumbrances of any kind and the contractor hereby agrees, at all times, to indemnify and save harmless the Government against all claims whatsoever to any materials in respect of which an advance has been made to him as aforesaid.

(3) That the said materials detailed in the said Running Account Bill (B) and all other Fin. R. Form No. 17-A

Materials on the security of which any further advance or advances may hereafter be made as aforesaid (hereinafter called the said materials) shall be used by the Contractor solely in the execution of the said works in accordance with the directions of the Divisional Officer ----------(hereinafter called the Divisional Officer) and in the terms of the said agreement.

(4) That the Contractor shall make at his own cost all necessary and adequate arrangement for the proper watch, safe custody and protection against all risks of the said material and that until used in construction as aforesaid the said materials shall remain at the site of the said works in the Contractor's custody and at his own risk and on his own responsibility and shall at all times be open to inspection by (he Divisional Officer or any officer authorized by him. In the event of the said materials of any part (hereof being stolen, destroyed or damaged or becoming deteriorated in a grater degree than is due to reasonable use and wear thereof Contractor will forthwith replace the same with other materials of like qualify or repair and make good the same as required by the Divisional Officer and the materials so brought to replace the said materials so repaired and made good shall also be considered as security for the said amount.

(5) 'Hurt the said materials shall not on any account be removed from the site of the said works except with the written permission of the Divisional Officer or an officer authorized by him in that behalf. (6) That the said amount shall be payable in full when or before the Contractor receives payment, from the Government of the price payable to him for the said works under the terms and provisions of the said agreement PROVIDED THAT if any intermediate payments are made to the contractor on account of work done then on the occasion of each such payment the Government will be at liberty to make a recovery from the Contractors Bill for such payment by deducting there from in the value of the said materials (hen actually used in the construction and in respect of which recovery has not been made previously the value for this purpose being determined in respect of each description of material at (he rates at which the amount of the advances made under these presents were calculated.

(7) That if the Contractor shall at any time make any default in the performance or observation in any respect of any of the terms and provisions of the said agreement or of these presents the total amount of the advance or advances that may still be owing to the Government shall

immediately on the happening of such default be repayable by the Contractor to the Government together with interest thereon at twelve

percent per annum from the date or respective dates of such advance or advances to the date or repayment and with all costs, charges, damages and expenses incurred by the Government in or for the recovery thereof or the enforcement of this security or otherwise by reason of (he default of the Contractor and any moneys so becoming due and payable shall constitute a debt due from the Contractor to the Government and the Contractor hereby covenants and agrees with the Government to repay and the same respectively to it accordingly.

(8) That the Contractor hereby charges all the said materials with the repayment to the Government of the said sum of Rupees ..... - ..... (Rs. .....) and any further sum or sums which may be advanced as aforesaid and a l l costs charges damages and expenses payable under these present PROVIDED ALWAYS and it is hereby agreed and declared that not withstanding anything in the said agreement and without prejudice to the powers contained therein if and whether the covenant for payment and repayment hereinbefore contained shall become enforceable and the money owing shall not be paid to accordingly.

Once therewith the Government may at any time thereafter adopt all or any of following courses as it may deem best ;-

(a) Seize and utilize the said materials or any part thereof in the completion of the said works on behalf of the Contractor in accordance with the provisions in that behalf contained in the said agreement debiting the Contractor with the actual cost of effecting such completion the amount due in respect of advances under these presents and crediting the Contractor with the value of work done as he had carried it out in accordance with the said agreement and at the rates thereby provided. If the balance is against the Contractor he is to pay the same to the Government on demand.

(b) Remove and sell by public auction the seized materials or any part thereof and out of the moneys arising from the sale retain all the sums aforesaid repayable to the Government under these presents and pay over the surplus (if any) to the Contractor.

(c) Deduct all or any part of the moneys owing out of the security deposit or any sum due to the Contractor under the said agreement.

(9) That except as is expressly provided by the presents interest on the aid advance shall not be payable.

(10) That in the event of any conflict between the provisions of these presents and the said agreement the provisions of these presents shall prevail and in the event of any dispute or difference arising over the construction or effect of these presents the settlement of which has not been hereinbefore expressly provided for the same shall be referred to the Superintending Engineer ..... Circle whose..... decision shall be final and the provisions of the Indian Arbitration Act for the time being in force so far as they are applicable shall apply to any such reference.

In witnesses whereof the* ----- —__..... on behalf of the Governor of Sindh and the said ..... — ..... - ..... --have hereunto set
their respective hands and seals the day and first above written.

Signed, sealed and delivered by* In
the presence of
Seal

1st witness 2nd witness

Signed, sealed and delivered by* In

the presence of

Seal

1st Witness 2nd witness

SPECIFICATIONS

[Note for Preparing the Specifications]

A set of precise and clear specifications is a prerequisite for bidders to respond realistically and competitively to the requirements of the user without qualifying their Bids. The specifications must be drafted to permit the widest possible competition and, at the same time, present a clear statement of the required standards of workmanship, materials, performance of the works. Only if this is done objectives of economy, efficiency, and fairness in procurement will be realized and responsiveness of Bids can be ensured, and the subsequent task of bid evaluation can be facilitated. The specifications should require that materials to be incorporated in the works be new, unused, and of the most recent or current models, and incorporated all recent improvements in design and materials unless provided for otherwise in the contract.

Samples of specifications from similar to previous procurements are useful in this respect.
The use of metric units is encouraged. Depending on the complexity of the works and the repetitiveness of the type of procurement, it may be advantageous to standardize the Technical Specifications that should cover all classes of workmanship, materials and equipment although not necessarily to be used in a particular procurement.

Care must be taken in drafting specifications to ensure that they are not restrictive. In the specification of standards for equipment, materials, and workmanship, recognized international standards should be used as much as possible. The specifications shall consider all conditions but not limited to seismic conditions, weather conditions and environmental impact. The specifications should state that equipment, materials, and workmanship that meet other authoritative standards, and which ensure at least a substantially equal quality than the standards mentioned, will also be acceptable. The following clause may be inserted in the Specifications.

Sample Clause: Equivalency of Standards and Codes

Wherever reference is made in the Specifications to specific standards and codes to be met by Works to be furnished and tested, the provisions of the latest current edition or revision of the relevant shall apply, unless otherwise expressly stated in the Contract. Other authoritative standards that ensure equivalence to the standards and codes specified will be acceptable.

1 GENERAL

1.1 *Mobilization for Construction of the Works*

The Contractor shall mobilize all resources as required for construction of Works according to Contract Provisions. The major items of mobilization are listed and described hereof are for illustration. The Contractor shall make his own assessment for provision and maintenance of mobilization and demobilization requirements and shall ensure their availability to the satisfaction of the Engineer.

(a) Mobilization of Contractor's plant to the Site.

(b) Mobilization of Contractor's personnel and labor at the Site.

(c) Provision of camps.

(d) Provision of such administrative and field offices, as the Contractor considers necessary for his organization.

(e) Provision of workshops, warehouses, sheds, and storage yards required by the Contractor for the proper and sufficient execution of the Works.

(f) Arrangements for supply of water for use in construction, including installation of the necessary wells, pumps, pipes, storage tanks, and suitable arrangements for the delivery of water at the various points of requirement.

(g) Maintenance of temporary site facilities provided by the Contractor for performance in connection with the Contract.

(h) Demobilization on completion of Contract.

The Contractor shall submit in advance for approval of Engineer his plans for mobilization and demobilization giving full details of resources, manpower and equipment involved.

1.2 *Shipment of Contractor's Plant and Equipment to Site*

The Contractor shall be responsible for the shipment of plant, equipment and machinery required for the execution of the Work to the specified Site within the specified time.

1.3 *Provision of Camps*

The Contractor shall provide such camps as are required for the proper and efficient progress of the work to house his own employees and to provide such Site office facilities for use of the Engineer and Employer as specified elsewhere in the Specifications. On the completion of the Contract, the Contractor shall remove the said camps and facilities and reinstate the camp area to the satisfaction of Engineer.

The Contractor's camps shall comply with the rules of the Pakistan Labour Camp Rules, 1960, 2001 issued by the Pakistan Health, Welfare and Local Government Department and the requirements therein set forth. The said rules are available with the Employer's Representative.

1.4 *Provision of Contractor's Office*

The Contractor shall provide such administrative and field offices as the Contractor considers necessary for his organization.

1.5 Latrines

The Contractor shall provide throughout the period of construction of the Works and shall maintain a n cleanse sufficient latrines for the use by his employees. He shall ensure that his employees do not fou the Site but make use of the latrines.

1.6 Provision of Contractor's Workshops, Warehouses etc.

The Contractor shall provide workshops, warehouses, shades, and storage yards required by the Contractor for the proper and sufficient execution of the Works.

The Contractor shall provide, maintain, operate such temporary buildings as his staff quarters, stores workshops, labour camps and other temporary buildings necessary for the execution of the Works at the place the Employer will provide. The Contractor shall submit site plans and general particulars of the prescribed buildings to the Engineer for his approval within the prescribed period. The construction o the buildings shall not be started until his proposals have been finally approved by the Engineer.

The Contractor's staff quarters and labour camps shall be provided with all necessary services fo drainage, lighting, roads, paths, parking places, fencing, sanitation, cook-houses, fire prevention and fi fighting equipment.

The Contractor shall also provide an adequate water supply system to the Contractor's office, his staf quarters, labour camps, workshops and other places of the Work on the Site. The Contractor shall mak his own arrangements for electricity supply to the Contractor's office, his quarters, labour camp workshop and stores.

1.7 Provision of Power Supply to offices, Facilities, Workshops, Camps etc.

The Contractor shall make his own arrangements for the supply of electric power for the purpose of th Contract.

1.8 Supply of Water for Construction

The Contractor will be required to furnish water for all aspects of construction

1.9 All other Items of Mobilization not Specifically Stated

Provision of such roads and others works as may be deemed necessary by the Contractor for the pro execution of the works.

1.10 Maintenance of Site Facilities of Contractor

The Contractor shall arrange service for all of his mobilization works, fixtures and equipment includ provision of all water, electricity and sewerage and refuse disposal services, until the end of maintenance Period. The Contractor shall replenish consumable items as and when required. At the of Maintenance Period, the contractor shall remove his camp and facilities and reinstate the camp to the satisfaction of Engineer.

1.11 Measurement and Payment

No separate payment shall be made for complying with any other provisions of this chapter ex where otherwise detailed in the Bill of Quantities.

1.12 Provisional Sum

Where in the Bill of Quantities, there is an item having the words "Prov. Sum" in the unit column which means a sum included in the Contract for the execution of any part of the Works or for the supply of goods, materials, Plant or services or for contingencies, which sum may be used in whole or in part or not at all on the instructions of the Engineer. The Contractor shall be entitled to only such amounts in respect of Work, supply or contingencies to which such Provisional Sum relate as the Engineer shall determine on the production of quotations, invoices, vouchers and accounts or receipts by the Contractor in connection with expenditure in respect of Provisional Sums. The Engineer shall notify the Contractor of any such determination with a copy to the Employer.

2 - THE SITE

2.1 *General*

The Site shall be that area as defined in Clause 2.0 of the Special Provisions. Right of way for access to the Works from existing roads shall be provided by the Contractor through his own arrangements. The Contractor shall make his own investigations of the condition of available public or private roads and of clearance, restrictions, bridge load limits and other limitation that affect or may affect transportation and ingress at the job sites, and shall bear all responsibilities in that respect.

2.2 *Use of Land for Construction Facilities*

The Contractor shall made his arrangements at his own cost to acquire land for field offices, construction plant, storage yards, and other facilities required for construction operations under the Contract.

The location, construction, maintenance and operation, of the Contractor's construction facilities shall be subject to the approval of the Engineer.

2.3 *Access to the Works*

Before the commencement of any part of the Works the Contractor shall make temporary access tracks including all necessary temporary diversions and bridge works to the part of the Site concerned, both for the Contractor's own access and for the maintenance of public access, all to the approval of the Engineer. The Contractor shall maintain such access tracks in a condition suitable for the safe and easy passage of plant, vehicles, and pedestrians until these tracks are no longer required for the purposes of the Contract. Other contractors employed upon the Project may use such access. The Contractor shall pay particular attention to the maintenance of existing irrigation channels and watercourses as specified in Clause 17.0 of the Special Provisions.

The Contractor shall make a record to be agreed by the Engineer of the condition of the surfaces of any private lands or any public cultivated or maintained lands over which access for the Site lies before use for access and he shall keep such surfaces in a reasonable state of cleanliness and repair during the execution of the Works. On the termination of the Contractor's use of such access he shall restore the surfaces to a condition at least equal to that obtaining before his first entry on them.

The Employer will provide assistance where the contractor encounters any difficulties in establishing a right of way to the works from existing roads.

2.4 *Roadways Crossings*

Where channels cross roads or tracks, these shall be kept open or temporary diversion roads must be constructed. Construction of temporary diversions and reinstatement of roads and tracks shall be in accordance with the provisions of the Contract.

2.5 *Damage to Channel and Drain Banks and Operating Roads*

The Contractor shall limit his loads, speeds, and hauling operations over the existing roads so as to minimize damage to other existing facilities. Ruts and scars resulting from the Contractor's operations shall be removed and any damage to channel embankments shall be promptly corrected to the satisfaction of the Engineer.

2.11 Condition of Site

The Contractor shall maintain the Site in a neat, tidy and healthy condition and free from accumulation of waste or rubbish.

2.12 Disposal of Waste Materials

(i) General

Waste materials including, but not restricted to, refuse, garbage, sanitary wastes, industrial wastes, and oil and other petroleum products shall be disposed of by the Contractor. Disposal of waste materials shall be by burying, where burial of such materials is approved by the Engineer; by burning where burning of such materials is permitted in accordance with local laws; or by removal from the construction area.

(ii) Disposal of Material by Burning

All materials to be burned shall be piled in designated burning areas in such a manner as will cause the least fire hazards. Burning shall be thorough and complete and all charred pieces remaining after burning, except for scattered small pieces, shall be removed from the construction area and disposed of. The Contractor shall, at all times, take special precautions to prevent fire from spreading beyond the piles being burned and shall be liable for any damage caused by his burning operations.

(iii) Disposal of Material by Removal

Disposal of material by removal from the construction area shall be accomplished prior to the completion of any section of the Works. All materials removed except trees, shall become the property of the Contractor. Materials to be disposed of by dumping shall be hauled to an approved dump. It shall be the responsibility of the Contractor to make any necessary arrangements.

(iv) Disposal of Trees

Trees and bushes cleared from the construction area shall be placed at the edge of the construction area or right of way. The Employer shall arrange the use and disposal of the wood. Where large trees are to be removed then the Engineer will determine how the trees are to be cut and removed and at the same time try not to impede the progress of the Works. All trees, tree roots and bushes not required by the Employer will be burned or removed from the Construction area at the Contractor's expense.

2.13 Prevention of Pollution

(i) Landscape Preservation

The Contractor shall exercise care to preserve the natural landscape and shall conduct his construction operations so as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work.

(ii) Prevention of Water Pollution

The Contractor shall comply with applicable regulations concerning the control and abatement of water pollution.

The Contractor's construction activities shall be performed by methods that will prevent entrance, or accidental spillage of solid matter, contaminants, debris, and other objectionable pollutants and wastes into flowing streams, flowing or dry watercourses, lakes and underground water sources; sanitary wastes shall be disposed of on land by burial at approved sites or by other approved methods.

2.14 *Preservation of Historical and Archeological Findings and Graveyards*

The Contractor agrees that should he or any of his employees and subcontractors in the performance of the Contract discover evidence of possible scientific, Pre-historical, historical, or archeological materials, he will notify the Engineer immediately in writing giving the location and nature of the findings. Where appropriate by reason of a discovery, the Engineer may order delays in the time of performance and/or changes in the Work.

The Contractor shall not trespass, excavate in or otherwise disturb graveyards whether shown on Drawings or not. In the case of unidentified graveyards or burial sites, the Contractor shall notify the Engineer in writing and the Engineer shall make such design changes as required.

2.15 *Measurement and Payment*

No separate payment shall be made for complying with the requirements of this chapter except where otherwise detailed in the Bill of Quantities.

3 - MATERIALS AND WORKMANSHIP

3.1 Sampling and Testing

The Contractor shall keep records of all tests he conducts in compliance with Specifications, or as required by the Engineer and shall submit copies of the results of such tests to the Engineer when required.

Tests required by the Engineer may be carried out at the laboratory nominated by the Engineer at the Contractor's expense.

Samples required for tests in the nominated laboratory shall be supplied and delivered by the Contractor in appropriate containers, suitably packed and labeled.

The Contractor shall provide for the approval of the Engineer samples of all construction materials and manufactured items required for the Works, if ordered. All samples rejected by the Engineer shall be removed from the Site. All approved items shall be stored on the Site by the Contractor for the duration of the Contract under conditions, which will prevent deterioration of the approved sample. Any materials or manufactured items subsequently delivered to the Site for incorporation in the Works shall be at least equal to the approved sample.

With regard to sampling, testing and the costs thereof, nothing in the foregoing shall be deemed to derogate from the responsibilities placed on the Contractor.

The Contractor shall, when required by the Engineer, provide suitable assistants for use in the supervision of the construction of the Works and these assistants shall be available to help carry out sampling and testing of materials and workmanship. The Engineer will notify the Contractor of his requirements in this respect at least one (1) day in advance. The Contractor shall provide the Engineer with a list of staff he proposes to use and details of their qualifications and experience. The Engineer may reject any or all of the nominated staff.

3.2 Concrete Sampling and Testing

The Contractor shall be responsible for providing samples of concrete and its constituent materials either for testing by himself or on behalf of the Engineer for testing at a nominated laboratory. Samples may also be taken by the Engineer for testing under the Contract at a nominated laboratory. Concrete test cubes, which shall be made in accordance with BS 1881 part 116/ASTM C-31 and C-39, shall be deemed to be sampled for the purpose of this Clause. All sampling of constituent materials shall be carried out in accordance with the provisions of the appropriate British / ASTM Standard, and sampling of fresh and hardened concrete shall be carried out in accordance with the provisions BS 1881/ASTM C-172 unless such provision is at variance with the Specifications. Details of all such samples shall be recorded by the Contractor and passed to the Engineer. The frequency with which such samples are to be delivered to the laboratory will be given by the Engineer in the form of a sampling plan. The Engineer will make available to the Contractor the results of each test carried out on the samples provided.

The tests, which the Contractor is required to undertake himself on behalf of the Engineer, are those to be carried out on fresh concrete at the place of final deposit, or elsewhere in the Site as directed by the Engineer. These tests comprise slump test to BS 1881,part 102/ASTM C-143. The frequency with which these tests are carried out shall be as directed by the Engineer in the form of a testing plan.

The Contractor shall also test aggregates for moisture content and so determine the water/cement ratio of the fresh concrete. Determinations of water/cement ratio shall be carried out as required by the Engineer and the results and calculations submitted to him.

The Contractor shall until the Maintenance Period (or such earlier date as directed by the Enginee supply, service and operate the necessary apparatus for sampling concrete and its constituent materia in accordance with the requirements and for slump tests on fresh concrete as described above.

Sampling of fresh concrete for concrete test cubes shall be carried out whenever possible, at the place deposition in the Works. From each such sample three (3) such cubes shall be made. Each cube shall b marked indelibly for identification when it is in the mould. After retention at the place where they a made for 24 hours, the cubes shall be delivered to the nominated laboratory for removal from the moulds, curing and testing. Moulds shall be returned to the Contractor for reuse. Sampling fres concrete for such cubes shall be carried out by the Contractor in accordance with a sampling plan draw up by the Engineer in accordance with the following principles.

The frequency of sampling for each class of concrete from each batching centre in each active day to b at a rate of:

(a) One sample from one batch of every 10 batches; or

(b) One sample per 350 cubic feet of concrete; or

(c) One sample;

Whichever involves the greatest number of samples? Where more than 700 cubic feet from o batching centre is placed in one location in one day, the rate of sampling may be decreased, with t approval of the Engineer to one sample from one batch of every 20 batches or one sample per 70 cubic feet of concrete, whichever involves the greatest number of samples. The actual rate of samplin may vary to the approval of the Engineer according to the random selection of batches to be sample and shall be increased when ordered by the Engineer in appropriate circumstances.

In addition to his other duties in connection with the sampling and testing of concrete, the Contracto shall provide the instruments for, and record the temperatures of the concrete and concrete materials, a required by the Engineer and copies of such records shall be supplied to the Engineer.

3.3 *Tests and Testing Equipment*

The following tests will be carried out in the Engineer's nominated laboratory as required under th Contract or ordered by the Engineer. The Contractor shall provide samples for the tests. Equipment carry out these tests shall be repaired as necessary by the Contractor, or provided to the Engineer' nominated laboratory by the Contractor, as required and ordered by the Engineer. The Contractor shal service the equipment as required and as ordered by the Engineer for the duration of the Contract.

(a) Soil and Earthwork Testing

(The number in brackets refer to the tests as specified in BS or ASTM standards)

(i) Determination of the Moisture Content:

(BS 1377: Part 2: 1990: 3);

(ASTM: D 2216-98) (ASTM C 566)

(ii) Determination of Atterburg Limits:

(BS 1377: Part 2: 1990: Clauses 4 and 5);

(ASTM: D 423 - 63; ASTM: D424 - 59).

(iii) Determination of the Particle Size Distribution - (Wet/Dry Sieving as appropriate):

(BS 1377: Part 2: 1990: Clause 9.2/9.3);

(ASTM: D422 - 63), (ASTM C 136).

(iv) Standard Proctor Compaction Test/ Using modified effort

(BS 1377: Part 4: 1990: Clause 3);

(ASTM D 1557).

(v) Determination of the Dry Density of soil on site:

Sand Replacement Method:

(BS 1377: Part 9: 1990: Clause 2.1 or Clause 2.2);

(ASTM D 1556), (ASTM D 1558). Core Cutter Method:

(BS 1377: Part 9: 1990: Clause 2.4).

3.4 Measurement and Payment

No separate payment will be made for complying with the provision of Clause 4.1, 4.2 and 4.3 (a to e) of the specifications.

Except where otherwise provided for in the Bill of Quantities no separate payment shall be made, interalia, for taking samples; delivery of samples to the Engineer's nominated laboratory; making slump tests; testing of aggregates and making moisture content tests; making concrete cubes; supply of instruments for, and recording of temperatures of concrete and concrete materials; preparation and submission of Site records, trials and proving of alternative Construction Plant, materials and methods of working suggested by the Contractor.

For tests on materials for incorporation in the Works or tests on the Works, no payment shall be made for delivery of any sample to a laboratory nominated by the Engineer if such sample or test shall fail to meet the requirements of the Specification, where such test is ordered or normally required to demonstrate compliance with the Specification.

For tests on materials before selection and approval of sources of materials for incorporation in the Works and for trials of Constructional Plant and methods of working for approval for use in constructing the Works including tests for resulting workmanship where not provided for in the Bill of Quantities, no separate payment shall be made.

4 - CARE AND HANDLING

4.1 *General*

The Employer does not guarantee or describe completely the conditions, which may be encountered in performing the Works. The Contractor must assume all responsibility for any conclusions, which he may derive from any information provided. The Contractor should also inspect and examine the site and its surroundings to collect all the pertinent information in this regard.

4.2 *Scope of Work*

The Works to be done under care and handling of water, consist of the following:

- Protecting all Works from damage by groundwater, rains and surface runoff during the entire construction period.
- Maintaining regular irrigation supplies during the period of construction of the Works.
- Dewatering foundations and care of water to maintain all excavations and surfaces dry free of water as required for the proper construction of the Works..

4.3 *Protection of Works*

The Contractor's proposals for protecting works constructed under the Contract from damage by flooding or otherwise shall be submitted to the Engineer, but such submission shall not in any way absolve the Contractor from responsibility for any damage, which may be incurred subsequently.

4.4 *Maintaining Drainage System*

The Contractor shall neither interrupt nor interfere with natural drainage system of the area for any reason or purpose without the written approval of the Engineer.

4.5 *Plans to be approved by the Engineer*

Prior to beginning of construction of any protection or diversion works, the Contractor shall submit fo approval of the Engineer his proposed plan for each protection and diversion work including all desig features of the channels and other facilities. The plan may be placed in operation upon approval bu nothing in the Contract Documents shall relieve the Contractor from full responsible for and shall repai at his own expenses any damage to the foundations, or any other part of the Works caused by flood water or failure of any part of the protection works.

The Contractor shall furnish all labour, equipment and materials for constructing and maintaining necessary bunds, channels, diversions, sumps, and other temporary protection. All such tempora protection and diversion works shall be removed or left and graded and so as not to interfere in any w with the operation or usefulness of the completed works.

4.6 *Measurement and Payment*

No separate payment shall be made for complying with all provisions of the chapter except wh otherwise detailed in the Bill of Quantities.

5 - EARTHWORKS

5.1 *Jungle Clearance*

Jungle is defined as any weeds, reeds, long grass, pan grass, bushes, hedges, trees, undergrowth or the like which may affect the visibility and access along the berms, inspection and non inspection paths. Jungle wherever occurs along the length of channel will be cleared only where ordered by the Engineer.

The trees shall not be fallen down without prior written authorization of the Engineer. The Work includes the clearance and disposal of jungle from the berms, inspection and non-inspection paths and side slopes. The contractor shall generally remove the same, which is visible above the ground including roots.

5.2 *Scarifying Ground Surface and Ploughing*

Where fill in embankments and in channels is to be compacted, the surface of the ground under the embankment shall be scarified to a depth of 6 inches so as to provide a satisfactory bond between ground and fill. The moisture content of the scarified surface shall be carefully controlled either by natural drying or by wetting with a fine spray. If for any reason, progress in compacting the fill is interrupted for a significant time, the surface of the fill material shall be scarified before compaction continues.

After the site clearance work has been completed, the ground surface under all embankments to be compacted shall be ploughed three times to a depth not less than 9 inches, moistened, if so required as specified in Clause 5.11

5.3 *Earthworks Specification*

The Contractor shall make excavations in any material and any conditions for the several parts of the Works and shall dispose of the excavated materials all as specified, shown on the Drawings, or ordered by the Engineer. The earthworks specification is divided into three sub-divisions, as follows:

A. General

B. Channels and Embankment

C. Structures.

A. General

The Contractor shall give the Engineer at least seven days written notice of his intention to commence earthworks on any part of the Site. The earthworks shall not be commenced until the Contractor has received written approval from the Engineer.

5.4 *Earthworks to Lines and Levels*

The whole of the earthworks for the several parts of the Works shall be carried out to the dimensions and the levels shown on the Drawings or to such other dimensions and levels as may be ordered by the

Engineer. Dimensions, which are based on, or related to, ground levels or chainages, shall be referred to the Engineer before commencing earthworks at any locations

For the purpose of the Specification the term ground level shall refer to the original profile before the start of earthwork operations.

5.5 *Extent of Excavations*

The extent of excavations shall be the minimum practicable in the opinion of the Engineer for the construction of the Works.

The excavation of the channel shall at any one time be limited to lengths previously approved by the Engineer in writing. Except with the written approval of the Engineer, work on each approved length shall be completed to the satisfaction of the Engineer before work on any new length is commenced.

5.6 *Excavation of Unsound Material*

(1) If any unsound material occurs in the bed or sides of a channel, in foundations, or below embankments, the Contractor shall remove and dispose of it to the satisfaction of the Engineer. Unsound material shall include roots, organic matter, mud, gypsum, surface layers of boulders, cobbles and gravel, and deleterious substances. Unless otherwise specified or ordered by the Engineer, the Contractor shall fill the voids so formed, with concrete Class D for structures, with compacted fill for channels and embankments, and with approved granular material for embankment pitching.

If the Contractor encounters any material, which in his opinion may be unsound, he shall immediately inform the Engineer who will instruct the Contractor in writing as to whether or not the material is to be treated as unsound.

(2) The above notwithstanding, where the Drawings show the placing of earthworks on vegetation existing prior to commencement of earthwork operations at any location, such vegetation shall not be considered to be unsound material except to the extent that the vegetation, or its roots etc, is deemed by the Engineer to be unsuitable.

(3) The provisions of Sub-Clause (1) notwithstanding, where the Drawings show excavation below the line of future embankments in order to remove roots of reeds, etc. the material so excavated shall not be classed as unsound if comprising roots, organic matter or mud, but shall fall within the classification of general excavation.

5.7 *Slips and Falls*

The Contractor shall exercise the greatest possible care and take all necessary precautions to prevent slips and falls of material from the sides of the excavation and embankments.

In the event of slips and falls occurring the Contractor shall make good all earthworks and associated works and execute any requisite modifications of the Works to the satisfaction of the Engineer.

5.8 *Fill*

Fill means selected suitable material placed to fill the channel to form pad. Selection shall, interalia, be such as to exclude material of particle size exceeding 6 inches unless otherwise specified or approved by the Engineer. Notwithstanding other provisions of the specifications all suitable sandy, silty and clayey

earth material will be accepted in the fill. Where channel excavation at any section does not furnish sufficient suitable fill material, the material shall be taken from designated borrow areas as approved by the Engineer. Fill placed against a structure shall not contain particles exceeding 2 inches in size unless otherwise specified or approved.

5.9 Borrow Areas

Where specified or ordered by the Engineer, fill material for incorporation in the Works shall be obtained from approved borrow areas after the completion of any tests to confirm the suitability of the material. On completion of excavation the Contractor shall, where applicable, trim, grade and leave the borrow area in a tidy condition and shall carry out any further earthworks necessary to prevent accumulation of water in the area, all to the satisfaction of the Engineer.

Borrow areas located in cultivable land shall be as shallow as is practicable in order that the land so used may be subsequently ploughed over and brought under cultivation. In such cases where land has been temporarily acquired, the Contractor shall remove top soil prior to excavation in the borrow area and shall replace it on completion of excavation and, following reinstatement, the maximum depth of excavation shall not exceed one foot.

The borrow areas shall not be continuous. For every 200 feet, a ten feet wide strip shall remain unexcavated, to avoid the formation of a continuous channel.

Material within the right of way of the channel which is in excess of the requirements of the inspection path and non-inspection path shall be considered as borrow material, if so directed by the Engineer.

The Contractor shall make his own arrangements with the landowners for procurement of borrow material from their lands.

5.10 Approved Material for Compacted Fill and Backfill

The material for compacted fill obtained from borrow areas shall comply with the following requirements:

(a) Sandy material with greater than 20% passing on a sieve nr. 200 sieve is unsuitable;

(b) The borrow areas to the approval of the Engineer;

(c) The borrow areas to be outside of the inspection path but, wherever possible, within the right of way

(d) Material excavated from borrow areas more than 2 feet in depth or from areas near standing crops o with vegetation will generally not be approved.

5.11 Compaction of Fill or Backfill

Embankment and backfill designated on the Drawing as compacted shall be compacted to the line, grad and slopes shown on the Drawing or directed in writing by the Engineer.

The compacted embankment shall be constructed of the most suitable material for impermeability ar stability as approved by the Engineer. The material to be compacted shall be deposited in horizon layer 6 inches thick as compacted. The compaction of earthwork used to fill the existing channel sh be carried out by mechanical rollers, rammers, vibrators or other approved plant so as to produce 90 modified AASHTO density at optimum moisture content. Where as the compaction of the fill mater

used to construct diversion channel will be carried out mechanically so as to produce 85% modified AASHTO density at optimum moisture content

The Contractor shall exercise careful control of the moisture content of the fill material prior to and during compaction such that it lies within a range of values established to the approval of the Engineer during the trials specified in Clause 5.12 herein and is suitable for the fill material and the method of compaction adopted.

5.12 Preliminary Trial for Compacted Fill

At least one month before commencing compaction of the fill in the Works, the Contractor shall submit to the Engineer details of the method and constructional plant proposed to be used, and shall make trials on Site. The Contractor shall make such tests of the materials before and after compaction as the Engineer considers necessary, both of the trials and of the Works, to ascertain to the Engineer's satisfaction that the degree of compaction specified is attained.

Any approval given by the Engineer to the Contractor's method of working will not relieve the Contractor of his responsibility to meet the requirements of Clause 5.11

5.13 Allowances for Settlement

The Contractor shall make due allowance for the effects of consolidation, including the settlement of fill and compacted fill, such that the levels, widths and dimensions of the finished surfaces at the end of the Maintenance Period are in accordance with the Contract.

5.14 Irrigation Operation during Earthwork Operations

There are planned closure periods for the irrigation system, which is only for one month, and so the Contractor should expect all earthworks operations to be undertaken whilst the channels are flowing Contractor shall make temporary arrangement to ensure water supply to watercourses, maintaining flow in temporary diversion channels.

5.15 Haul Routes

The operations of the Contractor on haul routes shall be in accordance with the Clause 2.5 hereof. The hauling of materials and other intrajob hauling and transportation over public highways, roads and bridges shall be in compliance with local regulations. Where haul routes cross public highways or roads the Contractor shall provide barricades, flagmen and other necessary precautions for safety. Where haul is necessary to take material from a borrow area to the site of an earthworks filling operation, the Contractor shall submit to the Engineer full details of the route and the distance, for his approval.

B. Channels and Embankments

5.16 Construction Methods

Earthwork in excavation/compaction for Rehabilitation/Lining of distributary /minor shall be carried out as outlined below or by a similar method subject to the approval of the Engineer. Full details of the Contractor's proposed method of working and earth moving plant shall be provided in accordance with the instruction for bidding. Rehabilitation of distributary/minor will be rehabilitated by excavation through mechanical means.

The inspection paths shall be generally formed with material excavated from bed and from borrow areas in accordance with Clauses 5.8 and 5.9 hereof.

5.17 *Excavation for Channel*

Excavation for channel shall be to the designed section as shown in the Drawings. The Contractor shall undertake excavation using the equipment and methods to the approval of the Engineer. The excavation shall be to the lines and levels specified in Clause 5.4.

Suitable material excavated from channel shall generally be placed alongside in fill to form maintenance berms, inspection paths and free board embankments as shown on the Drawings.

The Contractor shall prepare a plan of earthworks operation for each distributary/minor to be constructed at any one time, detailing the location and program of placing the fill in the channels. The Contractor shall submit his proposed plan of operation at least twenty-eight days before his intended date to commence earthworks on each particular location for the Engineer's approval.

5.18 *Fill for Channel*

Material for embankment fill shall be in accordance with Clauses 5.8 and 5.10. In placing embankment fill the Contractor shall spread the material approximately level layers of 9 inches loose thickness, by mechanical means including dressing and levelling and the compaction shall be carried out by mechanical rollers, rammers, vibrators or other approved plant so as to produce 90% modified AASHTO density at optimum moisture content in the channel prism and embankment and 85% modified AASHTO density for diversion channel.

Embankments with bank top level above ground level, shall not exhibit any signs of incipient seepage after prolonged retention at the maximum level.

5.19 *Carriage of Material*

When the suitable material in accordance with Clause 5.10 is not available within the range of haula distance of 100 ft, the borrow area shall be selected as per clause 5.9 within maximum distance up 3 mile of the site with the approval of Engineer. The material shall be carted by approved methods, or directed by Engineer

5.20 *Dressing and leveling of earth work*

Earth work shall be in accordance with Clause 5.18 embankments which carry un-surfaced roads sh be aligned and graded on the top surface by use of a motorized grader so as to permit the safe and ea passage of a light vehicle at a speed of 25 miles / hour and shall be maintained in this condition to t end of the Maintenance period.

The side slopes of the embankments shall be trimmed and all large lumps broken upto the satisfactory the Engineer.

5.21 *Transitions*

Except where otherwise shown, at all changes in cross section necessitated by design or any ot reason, transitions shall be formed in the bed and side slopes of the channel such that the horizonta vertical change in direction does not exceed a deviation of 1 in 10.

5.22 Gaps in Embankments

The Contractor shall create no gaps in the channel embankments unless express permission has been granted by the Engineer.

5.23 Over Excavation

Should any channel be excavated or any embankment or any berm be formed beyond the tolerance specified, the Contractor shall form the specified cross section or such other section as the Engineer may direct.

C. Structures

5.24 Dewatering

Where the Contractor is required to open up excavations in order to undertake construction of new structure or repair to an existing structure, he shall keep such excavation clear of water during the construction and repair work and, in case of structures being constructed in saline or any other aggressive groundwater, for such further period as may be necessary to avoid the submersion of newly placed concrete within 28 days of being placed. The method of keeping the excavation clear of water, dewatering, and disposal of water shall be subject to the approval of the Engineer. The Contractor shall ensure that sufficient stand-by plant is on the Site at all times to avoid any interruption in continuity of dewatering.

5.25 Method of Excavation

If required by the Engineer, the Contractor shall submit his proposed method of excavation, including details of necessary supports for the excavations, to the Engineer for his written approval.

5.26 Working Space

Excavation shall be carried out to such minimum dimensions as will permit adequate dewatering, proper support of the sides of the excavation, the erection of shuttering, placing of concrete and fill, including compaction, and any other construction operation.

5.27 Backfill and Fill

Backfill means selected material obtained from that excavated for the structure and replaced below original ground level. Selection shall be as for fill as specified in Clauses 5.8 and 5.10. All backfill and fill above original ground level at or adjacent to structures shall be compacted in accordance with Clause 5.11 or as directed by the Engineer.

5.28 Test on Formation Level

On reaching the level for hand trimming specified in Clause 5.31, the Engineer may order in-situ or other tests as specified to determine the nature and strength of the soil.

5.29 Structure Foundations

For structures, where the underside of part of the foundation lies between 4 inches and 18 inches below the existing ground level, the plan area of such section of the structure that is to be repaired shall be excavated in foundation to 18 inches below existing ground level and the space between the foundation

5.37 Measurement and Payment

(i) General

a) Earthwork (excavation and embankment) shall be measured in volume. The unit of measurement shall be cubic foot unless specified differently in Bill of Quantities.

The unit rates for earthwork quoted in the Bill of Quantities shall be deemed to cover earthwork in all types of soils (dry or submerged under water, soft or hard). Volume of excavation for channels, structures and embankment foundation shall be measured net as the product of cross-sectional area and lengths within the limits shown on Drawings or as approved by the Engineer. The limits of measurement shall be pay lines as shown on the Drawings unless otherwise specifically approved by the Engineer.

b) No separate measurement and payment shall be made for clearing and grubbing removal and disposal of unsound materials, foundation preparation, scarifying, providing material for backfilling around structures, surveying and making records of ground levels and topography within earthwork and structures reservation limits; supporting excavations; making good slips and falls; excess excavations for working space or any other reason; trimming and dressing surfaces of excavations and embankments; additional material placed on account of, or in anticipation of settlement; compaction trials; control of moisture content; preparation and restoration of borrow pits; re-handling; location and shaping of disposal heaps and embankments, and delays due to testing of in-situ materials. All costs on these accounts shall be deemed to be included in the unit rates of respective Bill of Quantities items.

c) No measurement or payment shall be made of earthwork for the construction and removal of temporary works required for completion of the specified works. Measurement shall not be made for earthwork for any structure or feature that is paid for as a lump sum or Provision Sum.

d) No measurement or payment shall be make of earthwork for the construction of diversion channel and for filling of existing channel until it is compacted to the specified dry density.

e) Neither excess excavation nor backfill of excess excavation beyond unsuitable material shall be measured for payment.

f) Neither excess excavation nor backfill of excess excavation beyond unsuitable material shall be measured for payment.

(ii) Jungle Clearance, Ploughing three times, Grubbing and Stripping

a) Measurement for payment of Jungle clearance shall be made in Sq.ft. The unit rate of jungle clearance shall constitute full payment for all operations involved in Jungle clearance including cutting and uprooting of bushes, weeds, reeds, plants etc., and disposal at location designated by the Engineer as per specifications set forth and or as directed by the Engineer.

b) No separate measurement for payment of stripping the area under embankments and channel bed shall be made and all costs for such activities shall be deemed to have been included in the unit rate of the other earthwork pay items.

c) Measurement for ploughing three times shall be made in Acres. Payment shall be made at unit price quoted in the Bill of Quantities

(iii) Excavation for Channels (Distributaries & Minors)

a) Except as specified herein, measurement for payment of unclassified excavation for the channels, will be made in cubic foot to the lines and grades shown on the Drawings or as prescribed by the Engineer. No payment shall be made for any additional excavation or backfilling required to adjust the sub-grade to correct levels during preparation of the sub-grade as specified.

b) Payment for unclassified excavation for the channels will be made at the unit rates quoted in the Bill of Quantities for item "Earthwork Excavation in Irrigation Channels".

c) The amount tendered for the Bill of Quantities item "Earthwork Excavation in Irrigation Channels" shall constitute full payment for excavation, placing the material in embankments, in spoil banks or in selected material stockpiles at specified locations, rehandling the material to be transported from stockpiles to the place of its use, refilling any excess excavation, and all work necessary to maintain the excavations in good order during construction.

(iv) Excavation for Structures

a) Measurement for payment for excavation for structures (unclassified) will be made in cubic foot of the material in excavation only outside of or below the excavation "pay line" of the channel or channel prism and will be made only for material excavated at the direction of the Engineer. The division planes for measurement and payment between excavation for structures and excavation for channel will be such that all excavation within the excavation "pay line" of the channel prism, regardless of the existence of structures or other required works, and regardless of whether the excavation for structures or other required works precedes or follows the excavation of the channel prism, shall be paid for at the unit rate tendered in the Bill of Quantities for the Item "Earthwork Excavation in Irrigation Channel" and all excavation for structure outside of or below the excavation "pay line" of the channel prism shall be paid at the unit rate tendered for the relevant item in Bills of Quantities.

b) Payment for unclassified Excavation for Structures will be made at the unit price quoted for the relevant item in Bill of Quantities.

c) The unit price quoted for Excavation for Structures shall constitute full payment for excavation, carrying out dewatering, placing the excavated material in embankment, backfill around structures, placing the material in stockpiles, rehandling the material to be transported from stockpiles to the embankments/backfill around structures, refilling any excess excavation; disposing of the excess or unsuitable material in spoil banks and all work necessary to maintain the excavations in good order during construction in accordance with the specifications set forth and as directed by the Engineer.
No separate measurement for payment of dewatering due to excavation of structures shall be made and all cost for such activity shall be deemed to have been included in the unit rate for the item "Excavation for Structures".

(v) Furnishing of Earthfill material (Fill/select fill) in Embankments, underneath the structures, in backfill around the structures etc, obtained from Borrow Areas.

a) Measurement for payment for furnishing earth fill material obtained from excavation or from Borrow Areas to the locations of its use in (v) above according to the lines and grades sh

on the drawings or established by the Engineer and duly accepted, will be made on the basis of the compacted volume in thousand cubic feet.

b) When borrow areas are designated on private lands, the Contractor shall be responsible for the ownership payment of borrowed earth material. If so required to be paid, and the rates and prices stated in the priced Bill of Quantities shall be deemed to cover all such ownership payments.

c) The amount tendered shall be full payment for furnishing the earthfill material obtained from suitable Borrow Areas; stripping and clearing borrow areas, preparation of material by ripping, excavating, moistening etc. loading and hauling from any distance to the location of its use, reinstatement of Borrow Areas after excavation and all other operations related to these items in accordance with the specifications or as directed by the Engineer.

d) The earth movement from borrow area with haul more than 100 ft should be undertaken in accordance with mass haul diagrams the positions of balancing lines on these mass haul diagrams shall have been agreed with the Engineer prior to commencement of earth moving, and such balancing lines shall generally have been positioned so as to provide the least cost to the Employer having regard to the rates for the earthwork involved as given in the Bill of Quantities. In the event that prior agreement has not been reached on the position of a balancing line the Engineer shall be entitled to choose how it shall be placed; the work shall be deemed to have been carried out to that effect and the measurement determined accordingly. Haul of more than 100ft shall be measured in haul unit (Hu) where one Hu represents the cartage of one cubic foot (1cft) of material over a distance of 50 feet (1 lead).
Compaction of embankment shall be measured in cubic ft for the volume of fill compacted above ground surface to the finished level of embankment according to Drawings and as approved by the Engineer.

(vi) Compaction of Earthfill Material (Fill/Select fill material) in Embankments

a) Measurement for payment of compaction for earthfill materials placed in embankments shall be made in cubic feet of compacted volume of earthfill/backfill as shown on the drawings or as otherwise directed by the Engineer in accordance with the specifications.

b) Payment for compaction of earthfill material in embankments shall be made at the unit rates quoted in the Bill of Quantities (Bill of Quantities) for compaction of earthfill in Embankments.

(vii) Compaction of Fill/Select fill material underneath the structures or of backfill around the structures.

a) Measurement for payment of compaction for fill/select fill materials placed underneath the foundations or in backfill around the structures shall be made in cubic feet of compacted volume of earthfill/ backfill as shown on the drawings or otherwise directed by the Engineer in accordance with the specifications.

b) Payment for compaction of fill/select fill material placed underneath the foundations or in backfill around the structures shall be made at the unit rates quoted in the Bill of Quantities for compaction of fill/select fill.

c) The amount tendered shall constitute full payment for compacting earthfill material (fill/backfill or select fill) including foundation preparation, moistening the soil, machinery for compaction, labour and/or any other activity required complete in all respects for item "Compaction of Earthfill in Embankments and Backfill around or underneath the Structures" in accordance with the specification or as directed by the Engineer.

The Payment for the carriage of material shall be made after the carriage is approved by Engineer.

CHAPTER-5
PROJECT MANAGER'S REQUIREMENT

5. Sand and Aggregate

5.1 Scope of Work

All sand, and aggregates to be used for the Works to be constructed under the Contract and for all related purposes, and, as may be required by the Engineer, shall consist of materials herein specified and shall be in accordance with the herein stated requirements. The stipulations and requirements herein set forth shall apply except where such stipulations and requirements are specifically modified by the Engineer for any particular item of work.

The contractor shall propose sources of sand, aggregates and revetment stones for approval of the Engineer and shall be responsible for their procurement, transportation, testing and storage at site.

5.2 Source of Natural Sand

All natural sand required for the work to be done under these Specifications shall be furnished by the Contactor. Such natural sand shall be obtained from river deposits or other approved sources. The Contractor will be permitted to obtain natural sand at no charge from sources that are the property of the Employer. If natural sand is obtained from sources not owned or controlled by the Employer, the Contractor shall make all necessary arrangements with the owner and shall, pay all rentals and other costs connected therewith.

Approval of a source of natural sand shall not be construed as constituting approval of all materials taken from the source, and the Contractor shall be responsible for the specified quality of all such materials used in the work. The Contractor shall submit to the Engineer, for preliminary tests and approval, a representative 100-pound sample of natural sand proposed for use at least thirty (30) days before use of such material is required.

5.3 Processing Natural Sand

The deposit of natural sand shall be cleared by the Contractor of all vegetation and other objectionable matter and all unsuitable Sand and gravel shall be removed. The deposit shall be developed and operated so as not to detract from the usefulness of the deposit. The material shall be screened and washed as necessary to produce natural sand meeting the requirements herein set forth.

5.4 Concrete Aggregate Plant

Aggregate plant capable of producing approved concrete aggregates meeting the Specifications at the rate necessary to meet the requirement of the construction schedule shall be furnished, installed, operated and maintained at locations approved by the Engineer. Facilities shall be provided for proper crushing, screening, washing, classification, storing, reclaiming, and delivery of aggregates to the batching and mixing plant. All crushing shall be performed in a minimum of two stages to obtain aggregates of cubical or spherical shape. Jaw crushers shall not be used except as the primary crusher. To achieve an acceptable particle shape, the fine aggregate may be manufactured using crushers specially adapted (Rollo bar or similar) to suit the type of material available.

The plant shall include facilities for washing coarse and fine aggregates after separation into the various size groups in order to "nave any fine material and organic mater before delivery to the concrete batching and mixing plant,

The coarse aggregate as produced and stockpiled will be graded into nominal sizes as per the Contractors plan approved by the Engineer.

5.5 Handling and Stockpiling and Aggregates

The Contractor shall handle, load, transport, unload and stockpile all sand 'arid aggregates as required to perform the construction of the Works specified herein. All methods employed by the Contractor for unloading, loading, handling and stockpiling sand and aggregates shall be subject at all times to the approval of the Engineer.

The location and arrangement of all stockpile areas shall be subject to the approval of the Engineer. The Contractor shall clear a. td evenly grade for drainage, all sites designated for stockpiling and shall handle stockpiling operations of sand and aggregates so that segregation and breakage will be kept to a minimum and that stockpiled material will not be contaminated with soil or other foreign material due to rain, surface floods or ground water. The Contractor will be required, at his own expense, to reprocess any sand and aggregates which may become segregated or contaminated due to improper stockpiling and lack of adequate protection. The Contractor shall conduct all stockpiling operations in such a maimed as to deposit all materials directly in final position in the stockpiles and in layers not more than 4 feet deep. Sand and aggregates shall not be moved from place to place in the stockpiles except as superficial leveling may be necessary to provide suitable roadways for trucks in placing successive layers, and the Contractor shall provide effective means to prevent breakage of aggregates caused by trucks operating over the stockpiles. Dumping over the ends or sides of the stockpiles will not be permitted.

Necessary measures to avoid rock breakage and to prevent materials from segregating by running down the outside slopes of stockpiles shall be adopted.

The total capacity of the storage for each category of aggregates shall be sufficient to ensure progress of work on the site for a duration of at least 5 days.

5.6 Aggregates Testing

The following tests are to be performed on the aggregates.

Characteristic	Test Method ASTM	Application
Grain size analysis	C136	All aggregates
Water content	C566	Fine aggregates
Water content	C566	Coarse aggregates
Sieve analysis	0136	All aggregates
Sp Gravity and Absorption	C127	Coarse aggregates
Sp Gravity and Absorption	0128	Fine aggregates
Los Angeles -	C131-C535	Aggregates above 1/8 inch
Organic matter	040	Fine aggregates
Sand equivalent	02419	Fine aggregates
Soundness	088	All aggregates
Flakiness and Elongation	BS 812	Coarse aggregates
Unit Weight and voids	C29/C29N	All aggregates
Light Weight Pieces	0123	All aggregates
Clay lumps & Friable Particles	0142	All aggregates
Alkali Reactivity	C227-C289	All aggregates
Petro graphic analysis	0295	All aggregates

All aggregates shall be continuously tested to ensure compliance with Specifications. The normal testing frequency is given in Section -Quality Control and Quality Assurance

5.7 Control and Quality Assurance

The term "sand" is used to designate aggregates in which the maximum size of particles is 3/16 of an inch. Sand to be used under these Specifications shall be processed from natural deposits. The sand particles shall be hard, dense, durable, un- coated inorganic rock fragments and all sand shall be free from injurious amounts of clay lumps, soft or flaky particles, shale, alkali, organic matter, loam, mica and other deleterious substances. The sand shall conform to ASTM Designation C33. The sand shall be washed, classified

and otherwise processed as required. The maximum percentage of individual deleterious substances in the sand shall not exceed the following values.

Percent B- weight

Materials Passing No.200 Screen
(ASTM Designation: C117) Lightweight Material.....3
(ASTM Designation: C123) Clay Lumps.....2

(ASTM Designation: C142) 00.....1
Total of Other Deleterious Substances 2
(such as Alkali, Mica, Coated Grains, Soft Flaky Particles and Loam)

The sum of the percentages of all deleterious substances shall not exceed five percent, by weight. Sand producing a color darker than the standard in the calorimetric test for organic impurities (ASTM Designation: C40) may be rejected, When required by the Engineer, the sand shall be subjected to a soundness test and may be rejected if the portion retained on a No.50 screen, when subjected to five cycles of the Sodium-sulphate test for soundness (ASTM Designation: C88), shows a weighted average loss of more than eight percent, by weight.

When tested by means of standard screens (ASTM Designation: E11), sand shall conform to the following limits:

Screen No.	Individual Percent, by Weight Retained on Screen
4	0-05
8	6-15
16	10-25
30	10-30
50	15-35
100	12-20
PAN	3-7

If the individual percentage retained on the No.16 screen is 20 percent or less, the maximum limit for the individual percent retained on the No. a screen may be increased to 20 percent. Fineness modulus of sand should range from 2.3 to 3.1.

All sand for mortar used in the construction or Masonry shall be natural sand furnished by the Contractor and when tested by means of standard screens (ASTM Designation: E11), shall conform to the following limits:

Screen No.	Percent By Weight. Passing Screen
8	100
100	15(max)

Within the above range.. the sand shall be well-waded and shall be as coarse as practicable for the production of workable mortar.

The natural and finished sand will be subject to testing by the Engineer to determine whether the sand produced conforms to the requirements of these Specifications. The Contractor shall furnish, without charge, such assistance as the Engineer may require in obtain representative samples for testing purposes and in inspecting plant facilities and operations of the Contractor.

5.8 Aggregates

The term 'aggregates" is used to designate aggregates which are reasonably well-waded within the range of 3/16 of an inch to 3 inches or any size or range of sizes within such limits. Aggregates to be used under these Specifications shall consist of natural deposit or quarried and crushed rock. The aggregates shall consist of well shaped. hard, dense. durable and un- coated rock fragments, and all aggregates shall be free union injurious amounts of deleterious substances. The percentage of individual deleterious substances in any size aggregates shall not exceed the following values:

	Percent by weight
Material PassingJo.2O0 Screen (ASTM Designation: C 117)	1
Lightweight Material (ASTM Designation: C 123)	2
Clay Lumps (ASTM Designation: C 142)	1/2

Other Deleterious Substances

The sum of the percentages of all deleterious substances in any size shall not exceed three percent, by weight. Aggregates may be rejected if they fail to meet the following test requirements:

The sum of the percentages of all deleterious substances in any size shall not exceed three percent, by weight. Aggregates may be if they fail to meet the following test requirements

a) Los Angeles rattler test (ASTM Designation: C 131 3: If the loss exceeds ten percent by weight at 100 revolutions, or 40 percent by weight at 500 revolutions.
b) Sodium-Sulphate soundness test (ASTM Designation: C88). Ii' the weighted average loss after five cycles is more than ten percent, by weight.
c) Specific gravity (ASTM Designation: C 127): If the specific gravity (saturated surface-dry basis) is less than 2.60.

The aggregates as produced and stockpiled will be graded in three nominal sizes as follows:

Designation of aggregate size	Nominal size range	Minimum percent retained on screen indicated
3/4 inch	3/16 to ¼ inch	45 to 80 percent on 3/8 inch
1.5 inches	¼ to 1.5 inches	45 to 80 percent on 1 inch
3 inches	1.5 to 3 inches	25 to 40 percent on 2.5 inches

Aggregates will be separated into specified sizes such that when tested by screening on the screens designated in the following tabulation the material passing the undersize test screen (significant undersize) will not exceed two percent by weight and all materials will pass the oversize test screen:

Aggregate size	For under size test	For oversize test
3/4 inch	5	7/8 inch
1.5 inches	5/8 inch	1.75 inches
3 inches	1.25 inches	3.5 inches

All screens used for gradation tests. for oversize and undersize tests. vi11 be woven wire cloth sieves conforming to the requirements of ASTM Designation:

E-11 with respect to permissible variations in average openings. The Contractor shall get the sources of sand and aggregates approved if-vance.

5.9 Measurement and Payment

No separate measurement and payment will be made labor sand and aggregates used in construction of any required works under these Specifications and all costs of providing such sand and aggregates shall be included in the unit rates of the relevant items tendered iii the Bill of Quantities for the respective Items in which such materials are to be used.

CHAPTER-6
PROJECT MANAGER'S REQUIREMENT

6. Cement

6.1 Scope of Work

The Contactor shall procure, nonsupport, store and handle all Ordinary Portland Cement and Sulphate Resisting Cement required in the construction of the Works.

6.2 Requirement

All cement shall be of Pakistani origin unless otherwise approved by the Engineer. All cement, shall be Ordinary Portland Cement conforming to ASTM C150 type-i except where the use of Sulphate Resisting cement conforming to ASTM C 150 Type V is specified and shown on the drawings.

Unless otherwise permitted, cement from not more than three plants shall be used and, in general, only the product of one plant shall be used in any particular section of the work.

6.3 Transportation

Transportation of cement from the cement plant to the point of use shall be accomplished in such a manner that the cement is completely protected from exposure to moisture. Cement which has been adversely affected by moisture, as determined by the Engineer, shall be rejected. Cement in sacks shall be delivered in strong, well-made, paper bags. each plainly marked with the manufacturer's name, brand, type of cement and the weight of cement contained therein.

The Contractor shall ensure that the cement sacks are not damaged during handling and transportation by the Contractor. Packages received in broken or damaged condition shall be rejected.

The Contractor shall have, at the site of the work, sufficient supply of accepted quality of cement and shall guard against possible Shortage from every cause.

STORAGE

The Contractor shall provide suitable storage for cement at proposed places convenient to the work, and the cement shall, at all tamps be carefully protected against moisture and exposure to air. Cement storehouses shall use weather-tight; shall have tight floors set at a proper distance above the pound; shall be large enough to maintain a sufficient supply of cement on hand to prevent delays or interruptions to the work and shall have sufficient floor space for storing each truck load of cement separately and affording convenient access thereto for sampling. counting of packages and removal. Cement in packages shall not be [illegible] height exceeding 7 feet.

To prevent undue aging of sacked cement after delivery, the Contractor shall use sacked cement in the chronological order in which sacked cement was stored so that it may readily be distinguished from other shipments. All empty sacks shall be promptly disposed of.

The Contractor shall employ competent storekeepers who shall have charge of the cement storehouses and keep suitable record of the delivery and use of all cement. Copies of these records shall be furnished to the Engineer at the close of each days work, showing in such details as he may require. the quantity of cement used during the day in each part of the work.

6.5 Inspection and Tests

Sampling, inspection and testing of all will be performed by the Engineer at the expense of the Contractor, and such sampling, inspection and testing will be in accordance with ASTM Deviation: C150 Type-' or the equivalent tests of the British Standards Institution as desisted by the Engineer. The Contractor shall notify the Engineer, the source and name of manufacturer from where he intends to procure cement and the Engineer shall have the right, at all times, to inspect the process of manufacture, the laboratory records of analysis and tests made at the cement plant and to take samples of the cement for testing. The Contractor shall provide all necessary assistance to the Engineer for taking of samples. If required, the contractor shall provide test certificate of the factory from which cement is procured for the specific lot supplied for works.

The Engineer may test the cement kept in storage at any time before. use. Cement failing to pass such tests shall be rejected. If any cement proves unsatisfactory and portions of it have been used in concrete, mortar or grout, then such concrete, mortar or grout will removed and replaced, using acceptable cement, at the Contractor's expense.

Cement may be rejected, at the discretion of the Engineer, if it fails to meet any of the requirements of these specifications. In the event of the cement failing to meet the requirements of these specifications, the cement shall be re-sampled and retested. If retest proves that the cement delivered is unsatisfactory, it shall be promptly removed from the site. Cement may be accepted on the basis of 7 day test results. provided results justify such acceptance. Otherwise, the results of the 28-days test at the normal testing rate must be approved prior to Shipment of the cement from the plant. Cement, which has been in storage at the site longer than four months, shall not be used until retesting proves it to be satisfactory.

6.6 Measurement and Payments

No separate measurement and payment will be made for cement used in any required construction under these Specifications and all costs of providing cement including handling, transportation and storage shall be included in the unit rates tendered in the Bill of Quantities for the respective items in which cement is to be used.

CHAPTER-7

PROJECT MANAGER'S REQUIREMENT

7.1 Scope of Work

All concrete required to be used for all structures to be constructed under these Specifications, and for all related purposes, and as may be required by the Engineer, shall consist of the materials herein specified and shall be proportioned, mixed, formed. placed. cured and finished in accordance with the herein stated requirements. All concrete work shall conform to all requirements of latest edition of ACT 301. The stipulations and requirements herein set forth shall apply except when such stipulations and requirements are specifically modified by the Engineer for any particular item of work.

7.2 Reinforcement

All reinforcement shall conform to the stipulations and requirements set forth in Section 'Reinforcement".

7.3 Sand and Aggregates

All sand and aggregates used in concrete and mortar required under these Specifications. shall be furnished by the Contractor in accordance with the provisions of and in complete conformity with the stipulations and requirements for sand and aggregates specified in the Section, "Sand and Aggregates".

7.4 Water

Clean fresh water is to be used for washing of aggregates and for mixing and curing concrete, mortar and grout which shall be obtained from a source approved by the Engineer. If required by the Engineer, samples shall be taken from the proposed source of supply and submitted to a laboratory nominated by the Engineer for testing at the Contractor's cost. The water to be used shall be free from injurious amounts of oil, acid, salt, alkali, organic matter or other deleterious substances as determined by standard laboratory tests according to MSHTO designation T26 "Quality of Water to be used in Concrete". The Engineer shall approve the source of water on the basis of the results of such laboratory tests.

7.5 Composition

1. Concrete shall be composed of Ordinary Portland Cement or Sulphate Resisting Cement as specified, sand, coarse aggregate and water, as specified, all well mixed and brought to the proper consistency Composition.

concrete having suitable workability, density, impermeability, durability and the required strength.

The amount of water used in the concrete shall be regulated as required, with the approval of the Engineer to secure concrete of the proper consistency and to adjust for any variation in the moisture content, or grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete resulting from excessive over mixing or objectionable drying before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required. The slump of the concrete, after the concrete has been deposited but before it has been consolidated. shall not exceed 3 inches. The Engineer reserves the right to require a lesser slump whenever such lesser slump is practicable and will produce concrete of better quality or of greater economy. Check Slumps shall be taken at the batch plant and at other locations as directed by the Engineer. The slump shall be determined in accordance with ASTM Designation: C143, except that fraction of material larger than 1 1/2 inches shall be removed by wet screening. For all concrete types the maximum water-cement ratio shall be 0.50.

6. The compressive strength of the concrete placed during the course of work will be determined by the Engineer on the basis of tests of 6 inch by 12 inch cylinders, made and tested in accordance with ASTM Desalinations C31 and C39 except that for all concrete samples from which cylinders are to be cast, the pieces of coarse aggregate larger than 1 112 inch shall be removed by screening or hand pitching. The Engineer may allow use of 6 inches x 6 inches cube in place of 6 inch x 12" cylinder. The conversion factor for cylinder strength shall be on the basis that 80% of cube strength is cylinder strength. Skimp tests will be made by the Engineer in accordance with Designation 22 of the United States Bureau of Reclamation Concrete Manual. The Contractor shall provide such facilities as may be necessary for procuring and handling representative test samples. The frequency of tests will be determined by the Engineer on the basis of the placement rate and the stricture, but no more often than necessary to assure himself that the concrete being placed conforms to the Specifications and design requirements.

7.6 Admixture

If the use of retarding or workability agents is approved by the Engineer then this use shall be subject to the following conditions:

a) no reduction of testing plan mean Length compared with additive free concrete of the same class;
b) no reduction of cement content prescribed;
c) no corrosive effect on reinforcement steel;
d) dosage of admixture to be as specified by manufacture

The Contractor may use a retarder to facilitate the preparation of construction joints, subject to the approval of the Engineer to the composition of the retarder and its method of application.

7.7 Batching

All concrete shall be produced at a batching plant and shall follow he "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", ACI 304. The Contactor shall provide such means and equipment as are required to accurately determine and control the amount of each separate ingredient entering the concrete. Such means and the equipment and its operation shall at all times be subject to approval by the Engineer. The amounts of cement, sand, and each size of aggregates entering each batch of concrete shall be determined by weight except as otherwise specified and/or authorized by the Engineer.

7.8 Mixing

The concrete ingredients shall be mixed in a batch mixer for not less than one minute after all ingredients, except for the frill amount of water, are in the mixer. The mixing time will be increased where the batch mixer exceeds a capacity of 2 cubic yards. The Engineer reserves the right to increase the mixing time when the Charging and mixing operations tail to produce a concrete batch throughout which the ingredients are evenly distributed and the consistency is uniform. The concrete shall be uniform in composition and consistency from batch to batch except when changes in composition or consistency are required. Water shall be added prior to, during, and following the mixer-charger operations. Excessive over-mixing requiring the addition of water to preserve the required concrete consistency will not be permitted.

Truck mixers will be permitted only when the mixers and their operations are such that the concrete throughout the mixed batch and from batch to batch is unitary with respect to consistency and grading.

Any concrete retained in truck mixers so long as to require additional water to permit satisfactory placing shall be wasted at the expense of the Contractor. Any mixer that at any time produces unsatisfactory results shall 1 J repaired promptly and Tactilely or shall be replaced.

7.9 Temperature

The temperature of concrete before placing shall not be more than 32° C nor less than So C. When the temperature of the concrete as placed may be between 27° C and 32° C, the concrete shall be mixed at the job site and discharged into the work immediately after mixing. If concrete is placed when the weather is such that the temperature of the concrete would exceed 32° C, as determined by the Engineer, the Contractor shall employ effective means which could include:

i) Providing shades and spraying water on gravel stockpiles
ii) Shading wording area including batching and mixing plants, cement silos
iii) Facilities for insulation.
iv) Painting water tanks and pipelines with reflective paint.
v) Refrigerating the mixing water.
vi) Spraying on formwork and reinforcement with a fog spray of clean water at a temperature not exceeding 2S degree C
vii) Protection of the concrete during transportation and placing against solar radiation.
viii) Employing ice or liquid nitrogen for cooling the mixing water.
ix) Concreting at night.

For the concrete lining of the canal, concrete placement shall not be permitted between 0800 hours and 1700 hours during the months of May, June, July and August.

For other concrete works if, in the opinion of the Engineer, the maximum temperature reached by the concrete during hydration could nevertheless damage the finished work, the Engineer may order the following:

i) Stop concreting during the hottest part of the day.
ii) Concrete at night only.

7.10 Form Design

Forms shall conform to the various shapes, lines, grades and dimensions of the concrete as shown on the Drawings or as established by the Engineer. Forms shall be mortar tight and sufficiently rigid to prevent objectionable deformation under load. The material lobe used and the design of the forms shall be subject to approval by the Engineer before construction of forms is started; however, such approval will not relieve the Contractor of responsibility for the adequacy of the form nor from the necessity for remedying any defects which may develop or become apparent from their use. The Engineer may at any time reject any sections of forms found deficient in any respect and the Contractor shall promptly remove the rejected forms from the work and replace them at his own expense

7.11 Form Construction

Forms to confine the concrete and shape it to the required lines shall be used wherever necessary. Forms shall be of metal, of metal-lined timer. plywood lining, tempered pressed wood lining, or of smooth planed boards, in good condition as required to produce the surface finish specified herein.

A smooth finished surface of the concrete will be required wherever it is a part of a waterway. The forms for such surfaces may be made 01 either wood or metal and shall be true in every respect to the required shape and size, and shall be of sufficient strength and rigidity to maintain their position and shape under the loads and operations incident to placing and vibrating the concrete. All wood forms on waterway surface shall be

planed and sanded to eliminate form marks insofar as it is practicable. Suitable and effective means shall be provided in the construction of all forms for holding adjacent edges and ends of panels and sections tightly together and in accurate alignment so as to prevent the formation of ridges, fins, offsets or similar surface in the finished concrete.

All forms when erected shall be tight. Adequate and suitable means for removing the forms without injury to the surface of the finished concrete shall be provided. Before concrete is placed, the surface of the forms shall be oiled with approved commercial oil that will effectively prevent of the concrete to the forms and will not stain the concrete. All bond breaking materials or processes shall be used oily after approval by the Engineer.

All forms shall be properly secured in position so as to prevent floating. or other movement, during the placing of concrete. They may be supported during placement of concrete on concrete piers, metal pedestals or by other approved means. Form supports shall be carried to firm foundation so that no settlement of the forms will be possible during construction.

Formwork for successive lifts shall be project secured and sealed against the face of previous lifts so as to prevent the following;

1. Bulging of concrete at the interface of the two lift
2. Leakage of fines from the freshly placed layer from between the formwork and the previous lift.

Formwork lies, if placed such that they lie within the body of the concrete. should be treated, subsequent to concreting such that:

1. They do not allow seepage through the path of the ties; and
2. The metal ties do not come in contact with the atmosphere and external which would corrode the tie

7.12.1 Preparation for Placing

Concrete placing shall follow the recommended Practice of ACT 304. No concrete shall be placed until all formwork, reinforcement, installation of parts to be embedded, bracing of forms and preparation of surfaces involve" in the placing have been approved by the Engineer in writing.

Approval of the method of placement proposed will not relieve the Contractor of his responsibility for its adequacy and the Contactor shall remain solely responsible for the satisfactory consecution of all work under the Contract. No concrete shall he placed in water , except with the written permission 'of the Engineer, and the method of depositing the concrete shall be subject to his approval. Concrete shall not be placed in numbing water and shall not be subjected to the action of running water until after the concrete has sufficiently hardened. All surfaces of forms and embedded materials that have

become encrusted with dried mortar or grout from concrete previously placed shall be cleaned of all such mortar or grout before the surrounding or adjacent concrete is placed. Immediately before placing concrete, all surfaces upon or against which the concrete is to be placed shall be free from standing water, mud, debris or loose material. The surplices of absorptive materials against or upon which concrete is to be placed shall be moistened thoroughly so that moisture will not be drawn from the freshly placed concrete. For concrete placed on ground the water table should be maintained at least 3 ft. below the owest concrete level for at least twenty four (24) hours after the pouring of concrete has been completed.

Where fresh concrete is to be placed on where shown on drawings, the Contractor shall place a 3 inches thick layer of blinding concrete on excavated earth before placing fresh concrete. The blinding concrete shall be spread uniformly over the foundation to be protected and allowed to set for 24 hours prior to the placement of the fresh concrete as per provisions of these specifications.

Concrete surfaces upon or against which concrete is to be placed, and to which new concrete is to adhere, that have become so rigid that the new concrete cannot be incorporated integrally with it, are defined herein as "construction joints. The surfaces of construction joints shall be clean and damp when covered with fresh concrete or mortar. Clearing shall consist of removal of all laitance, / loose or defective concrete. coatings or foreign material. The surface of construction joint shall be cleaned by wet sandblasting or other approved methods and then washed thoroughly with high pressure air-water jets immediately prior to placement of fresh concrete. The sandblasting and washing shall be performed at the last opportunity prior to placement of concrete. All pools of water shall be removed from the surfaces of construction joints before the new concrete is placed.
The surfaces of all contraction joints or expansion joints as shown on the Drawings shall be thoroughly cleaned of accretions of concrete or other foreign material by scraping, chipping or by other means satisfactory to the Engineer.

7.13 Placing

1. The method and equipment used for transporting concrete shall be such that concrete having the required composition and consistency will be delivered to the work, without objectionable segregation or loss of slump. Concrete shall be placed and compacted well within the initial setting time.

2. Concrete shall be placed only in the presence of the Engineer o. his authorized representative. After the surfaces have been prepared satisfactorily surfaces of construction joints upon which new concrete is to be placed shall be covered with a layer of mortar approximately 3/8-inch thick. The mortar shall have the same proportions of cement and sand as the regular concrete mixture, unless otherwise directed. The water- cement ratio of the mortar shall not exceed that of the concrete to be placed upon it, and the consistency of the mortar shall be suitable for placing and working in the manner hereinafter specified. The mortar shall be spread uniformly

and shall be worked thoroughly into all irregularities of the surface. Concrete shall be placed immediately upon the fresh mortar. In placing concrete against formed construction joints, special precautions shall be taken to ensure that the new concrete is brought into intimate contact with the surface of the joint, by careful pudding and spading with the aid of suitable tools.

3. Re-tempering of concrete will not be permitted. Any concrete which has become so stiff that proper placing cannot be assured shall be wasted and no payment will be made to the Contractor for such wasted concrete. The placement of concrete shall be carried on at such a rate and in such a manner that formation of cold joints is prevented. Concrete shall be deposited in all cases as nearly as practicable directly in its final position and shall not flow in a manner to permit or cause segregation. Excessive separation of coarse aggregate in concrete, caused by allowing the concrete to fall freely from too great a height, or at too eat an angle from the vertical, or to strike the forms or reinforcement will not be permitted, and where such separation would otherwise occur, the Contractor shall provide suitable drop chutes and baffles to confine and control the falling concrete.

4. Except as intercepted by joints, all formed concrete shall be placed in continuous approximately horizontal layers. the depths of which generally shall not exceed 20 inches. The Engineer reserves the right to require lesser depths of layers where concrete in 20 inches layers cannot be placed in accordance with the requirements of' these Specifications. All intersections of construction joints with concrete surfaces shall be made straight and level or plumb.

5. In placing concrete in large thick lifts, the exposed area of fresh concrete shall be kept at the practical by first building up the concrete to the frill width of the structure and to full height of the lift over a restricted area at one end of the structure and then continuing in similar progressive stages to the full are— of the structure. The slope formed by the upstream edges of the successive layers of concrete shall be kept as steep as practicable in order to keep its area to a minimum Concrete shall be placed directly at its final location. Use of vibrators to move concrete to its final position shall not be permitted. Concrete along these edges shall not be vibrated until adjacent concrete in the layer is placed, except that it shall be vibrated immediately when conditions are such that the concrete will harden to the extent that later vibration will not fully consolidate ad integrate it with more recently placed adjacent concrete. Clusters of large aggregates shall be scattered before new concrete is placed over them. Each deposit of concrete shall be vibrated completely before another deposit of concrete is placed over.

6. Concrete shall not be placed during rains sufficiently heavy or prolonged to wash mortar from coarse aggregate on the slopes of the placement. During such rains mortar should not be spread on construction joints and diluted mortar already spread shall be removed and replaced before continuing with the work. Once placement of concrete has commenced in a structure, placement shall not be interrupted Sufficient

atonements should be made to cover the green concrete in case heavy rain commences during concreting. This may be achieved by using polyethylene sheets or tarpaulin in sheets over the area being concreted such that rain water does not reach the green concrete. Placing of covering sheets directly on the concrete shall not be permitted

7. Concrete buckets where used shall be capable of promptly discharging the low slump. concrete mixes specified and the dumping mechanism shall be designed to permit the discharge of as little as 0.5 cubic yard portion of the load in one place. Buckets shall be suitable for attachment of and use of drop chutes where required in confined locations.

8. Construction joints shall be approximately horizontal unless otherwise shown on the Drawings or ordered by the Engineer. Arrangements should be made to avoid feather edges less than 60D whether they are in the current lift or in a subsequent lift, by chamfering that part of the lift to an angle of at least good and width at least 6 inches

9. If concrete is placed monolithically around openings having vertical dimensions greater than 2 feet, or if concrete in decks, floor slabs, beams, girders, or other similar parts of structures is placed monolithically with supporting concrete. the following instructions shall be strictly observed.

   a) Placing of concrete shall be delayed from one to three hours at the top of openings and at the bottoms of levels under decks, floor slabs, beams, girders. or other similar parts of structure members when are specified: and in bottom of such structure members when bevels are not specified but in no case shall the placing be delayed so long that the vibrating unit will not readily penetrate of its own weight the concrete placed before the delay. When consolidating the concrete placed after the delay, the vibrating unit shall penetrate and re-vibrate the concrete placed before the delay.

   b) The last 2 feet or more of concrete placed immediately before the delay shall be placed with as lowa slump as practicable and special care shall be exercised to effect thorough consolidation of the concrete.

   c) The surfaces of concrete where delays are made shall be clean and free from loose and foreign material when concrete placing is started after the delay.

   d) Concrete placed over openings and in decks, floors, beams, girders and other similar parts of structures shall be placed with as lowa slump as practicable and special care shall be exercised to effect thorough consolidation of the concrete.

10. Each layer of concrete shall be consolidated to the maximum practicable density, so that it is free from pockets of aggregates, and closes snugly against all surfaces of forms and embedded materials. In consolidating each layer of concrete the vibrating

head of the vibrator shall be allowed to penetrate and re-vibrate concrete in the upper portion of the under- lying layer. All concrete shall be consolidated with electric or pneumatic. power immersion-type, vibrators, operating at speeds of at least 7,000 revolutions per minute when immersed in the concrete. Additional layers of concrete shall not be placed until the layers previously placed have been worked thoroughly as specified

7.14 Removal of Forms

The Contractor shall be responsible for ensuring that sufficient time has elapsed for the concrete to attain sufficient strength before removal of forms. The time and method of removal and moving of forms shall be as directed by the Engineer, and this work shall be done with care so as to avoid injury to the concrete. No loading on green concrete will be permitted. Use of crow bars for removing formwork by wedging against the newly hardened concrete shall not be permitted. As soon as the forms are removed, the surplice of the concrete shall be carefully examined, and any defective concrete or irregularities in the surface be immediately repaired to the satisfaction of the Engineer.
In general, the minimum elapsed time before removal of forms shall be one day for unloaded walls and other side forms, seven days for supporting walls and conduits and 14 days for slab and bridge decks.

7.15 Curing

All concrete shall be cured in accordance with ACI 308. The Contractor shall have all equipment and materials needed for adequate curing and protection of the concrete on hand and ready to use before actual concrete placement begins. All concrete shall be cured by water curing. Concrete cured with water shall be kept wet for at least 7 consecutive days (14 days in case of reinforced concrete) immediately (after the initial set) following placement or until covered with fresh concrete, by coveting with water-saturated material, or by a system of perforated pipes, mechanical sprinklers, or porous hose, or by any other approved method which will keep all surfaces to be cured continuously (not periodically) wet. Water used for curing shall meet the requirements of these Specifications for water used for mixing concrete.

7.16 Protection

The Contractor shall protect all concrete against injury until final acceptance by the Engineer. Exposed surfaces of all concrete shall be protected from the direct rays of the sun for at least the first three days after placing. Such protection shall be made effective as soon as practicable after the placing of temporized concrete or after the removal of forms from formed concrete.

7.17 Finishes and Tolerances

1) Finishing of concrete surfaces shall be performed only by stilled Finishing including and in the presence of the Engineer or his authorized representative. Concrete surfaces will be tested by the Engineer where necessary to determine n

surface irregularities are within the limits hereinafter specified. Surface irregularities are classified as 'abrupt or "gradual". Offsets caused by displaced or misplaced form sheathing, or lining, or form sections, or by loose knots in forms, or otherwise defective form lumber, will be considered as abrupt irregularities, and will be tested by direct measurement. All other irregularities will be considered as gradual 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 5 feet for testing of formed surfaces and 10 feet for testing of unformed surfaces. Before acceptance of the work, the Contractor shall clean all exposed surfaces, unless otherwise specified. of unsightly encrustation and stains.

2) Unless otherwise specified, the classes of finish for formed surfaces shall be as follows

a) Formed surfaces upon or against; which backfill or concrete is to be priced will require no treatment after form removal except for the removal and repair of defective concrete and for the specified curing. Correction of surface irregularities will be required for depressions only, and only for those which, when measured as described in sub-clause (1) shall not exceed 114 inch for abrupt irregularities and 112 inch for gradual irregularities

b) Submerged and below ground formed surfaces which are not exposed to the action of flowing water and are not prominently exposed to public view will need no sack rubbing and no grinding other than that needed for repair of surface imperfections. Surface irregularities, measured as described in sub-clause (1) shall not exceed 1/4 Inch for abrupt irregularities and 1/2 inch for gradual irregularities

c) Formed surfaces of structures above ground which are prominently exposed to public view shall have and accurately constructed forms of hr plywood lining, tempered pressed wood lining or smooth planed boards with tongue and groove or shiplap joints. Steel lining not be permitted. There shall be no visible offsets, bulges or misa1igiment of concrete. Surface irregularities, measured as described in sub-clause (1) shall not exceed 1/8 inch for abrupt irregularities arid 114 inch for gradual irregularities

d) The surfaces of all waterway passages; and all other formed surfaces subject to the action of flowing water, shall have forms constructed of metal, metal-lined timber, for plywood lining, tempered pressed wood lining or smooth planed boards! The forms must be strong and held rigidly and accurately to the correct alignment. Surface irregularities, measured as described in sub-clause 1) shall not exceed zero for abrupt irregularities and 114 inch for gradual irregularities

3) Interior unformed surfaces shall be sloped for drainage where shown on the Drawings or as directed by the Engineer. Surfaces which will be exposed to the weather and which would normally be level, shall be sloped for drainage. Unless

the use of other slopes on level surfaces is indicated on the Drawings or directed by the Engineer, narrow surfaces, such as tops of walls and curbs, shall be sloped approximately 1/4 inch per foot of width; broader surfaces, such as platforms and decks, shall be sloped approximately 1/8-inc/i per foot. Unless otherwise specified, classes of finish for unformed surfaces shall be as follows:

a) Unformed surfaces that will be covered by backfill or by concrete shall be finished by sufficient leveling and screening to produce an even unlearn surface. Surface irregularities, measured as described in sub-clause (1) shall not exceed 3/8-inch for gradual irregularities

b) A hard steel trowel finish shall be applied to unformed surfaces that will be exposed to view or that will be subjected to the action of lowing water. Floating and toweling may be performed by use of hand or power-driven equipment. Floating and toweling, shall lie started as soon as the screened surface has silenced sufficiently, and shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Surface irregularities, measured as described in sub- clause (1) shall not exceed 1/4 inch for gradual irregularities and no trowel marks or abrupt irregularities will be permitted. Joints and edges shall be tooled.

7.18 Repairing Concrete Surfaces

1). if, after stripping of forms, any concrete is found to be not formed as shown on the Drawings, or is out of alignment or level, or shows a defective surface, it shall be considered as not conforming with the intent of these Specifications and shall be removed and replaced by the Contractor at his expense unless the Engineer grants permission to patch the defective area, in which case patching shall be performed as described in the following sub-clauses.

2) Defects that require replacement or repair are those that consist of honeycomb, damage due to stripping of forms, loose pieces of concrete, bolt-holes. tie-rod holes, ridges at form joints and bulges due to movement of the forms. Ridges and bulges shall be removed by chipping or tooling followed by rubbing with a grinding stone. Honeycomb and other defective concrete shall be chipped out, the chipped openings being edged and shaped so that the filling will be keyed in place. All holes shall be thoroughly moistened for 24 hours before the filling i& placed. The surface of the shall be finished flush with the surrounding wall, and shall have the same texture and color. All patches shall be cured.

3) When, in the opinion of the Engineer, the extent of the imperfections in structures exposed to view are such that patching alone would not produce a wall of satisfactory appearance, the Contractor will be required to give such walls, as well as adjacent walls, a sack rubbed mortar finish in accordance with the Engineer's instructions

4) Imperfections, and holes equal to, or greater than the least surface dimensions, narrow slots, cuts for repair of cracks, and bolt and tie-rod fastener recesses, shall be filled with dry patching mortar composed of one part of Ordinary Portland/Sulphate Resisting cement to two parts of regular concrete sand (volume measurement together with a non- shrink patching compound, approved by the Engineer, in the amount specified by. the manufacturer, and just enough water so that, after the ingredients are thoroughly mixed. the mortar will stick together on being molded into a ball by slight pressure of the hands and will not extrude free walker. Chipped-out honeycomb areas and other imperfections permitted by the Engineer to be repaired shall be filled with dry patching mortar as described above, bonded with epoxy. Immediately prior to placing the mortar, the surface of the area to be filled shall be coated wit an epoxy bonding compound as approved by the Engineer. Mixing and application of the epoxy bonding compound shall be in strict accordance with the manufacturer's recommendations. Mortar repairs shall be placed in thin layers and thoroughly compacted by suitable tools. Care shall be taken in filling rod, bolt and pipe holes so that the entire depth of the holes is completely filled with compacted mortar

5) Concrete filling shall be used for holes extending entirely through concrete sections: for holes in which no reinforcement is encountered and which are greater than 1.0 square foot in area and deeper than 4 inches; and for holes in reinforced concrete which are greater in area than 0.5 square foot and which extend beyond reinforcement.

7.19 Bitumen Coating to Concrete Surface in Contact with Soil

Where ordered by the Engineer or shown on the Drawings, bituminous coatings shall be applied to concrete structures in order to protect the concrete against attack from naturally occurring soluble sulphates in ground water. Generally protective coatings \Sill be applied to surfaces in contact with soil.

Before applying any coating, the surface of the concrete shall be cleaned of all dirt. dust and loose material and, where necessary, any surface shall be made good so that ii. is smooth and free from air or water holes. No coating shall be applied until the Engineer has approved the preparatory work.

The protection shall be applied using, approved bituminous coating. The method of application of bituminous coat shall be as per manufacturer's instructions in order to provide protection to the under side of structures, the bituminous coatings shall be applied to the blinding layer before the placing of the structural concrete. The blinding layer shall first be given a wood float finish. The blinding and protection shall extend beyond the outer edge of the structural concrete by at least 4 inches so that subsequent coatings applied to the structural concrete can overlap the blinding layer and provide unbroken protection. The structural concrete shall not be placed on the blinding layer unfill the protection is thoroughly dry and not in any case until 60 hours have elapsed following the completion of the protection.

7.20 Construction Joints

Construction joints are joints which are purposely placed in concrete to facilitate construction; to reduce initial shrinkage stresses and cracks; to allow time for the installation of embedded metalwork; or to allow for the subsequent placing of other concrete. Bond is required at construction joints regardless of whether or not reinforcement is continuous across- the joint.

The location of all construction joints in concrete work shall be subject to approval of the Engineer, and the joints shall be constructed in accordance with the Specifications and Drawings. No separate payments shall be made for construction joints

7,21 Expansion Joints

Expansion joint shall be provided where shown on the Drawings. Joint filler shall be placed in all expansion joints of concrete structures except as shown otherwise on the Drawings. Expansion joint filler shall be preformed, cross-linked, non-absorbent, semi rigid cellular polyethylene type, to be applied over the full .Joint width except as otherwise indicated on the drawings arid shall conform to requirements of ASTM 01 752. Standard Specifications- for Preformed Sponge Rubber and Cork Expansion Joint Fillers far Concrete Paving and Structural Construction.

The concrete surface of the expansion joint shall be free of all coatings, dirt, laitance and other foreign materials. The expensing joint filler shall be positioned against the concrete previously placed in a manner recommended by the manufacturer, and with no gaps between adjacent panels of filler material, before the subsequent concrete is placed. Care shall be exercised in storing and handing the joint filler.

After concrete placement is completed, all exposed edges of expansion joint filler shall be sealed At the top of all hospital expansion joints and at the surface of all vertical expansion joints that will be in contact with flowing water, the expansion joint filler shall have been set back one inch the base of the chamfer, and the remaining 1-inch depth shall be filled with an electrometric joint sealer suitable for use in water conforming to the requirements of ASTM Designation: C920-98. The completed expansion joints shall be well-sealed and be neat in appearance to the satisfaction of the Engineer.

7.22 Testing of Concrete

1) Strength tests of the concrete place during the course of the work will be made by the Engineer in an approved laboratory' at the Contractors expense. The Contractor shall assist the Engineer in obtaining, for control purposes, such number of cylinders as the Engineer may direct, but in general, two sets of three cylinders taken from each 2000 cubic feet of concrete or from each day's pour, whichever is more, of each class of concrete placed, shall 'govern. Test specimens will be made and cured by the Engineer in accordance with the

applicable requirements of ASTM Designation C3 1, "Standard Method of Molding and Curing Concrete Compressive and Flexural Test Specimen in the Field".

2) Cylinders will be tested by the Engineer in accordance with the applicable requirements old ASTM Designation C39, "Standard Method of Test for Compressive Strength of Cylinder Concrete Specimens". The test result will be based on the average strength of test specimens except that if one specimen in a set of three shows evidence of improper sampling, molding, or testing, the test rest; -"ill be based on the average of the remaining two specimens. If specimens out of a set of three show such defects. the results of the set will be discarded and average strength shall be determined from test results of sets. The standard age of test will be 28-days, but 7 -days tests may be use the discretion of the Engineer, based on the relation between the 7 -days and 28- days' strengths of the concrete as established by tests for the materials and proportions used. If the average oil the strength tests of the specimens cured under laboratory controls, for any portion of the work, falls below the minimum allowable compressive or flexural strength at 28-days required for the class of concrete used in that potion. the Engineer may change the proportions of the constituents of the concrete, as necessary to secure the required strength for the remaining portions of the work. If the average strength of the specimens cured under actual field conditions as specified hereinbefore. falls below the minimum allowable strength, the Engineer will make such changes in the conditions for temperature and moisture under which the concrete work is being placed and cured as may be necessary to secure the required strength. The Contractor will also be required to bear any additional expense due to sub- strength concrete.

3) Where the results of the straight tests of the control specimens indicate that the concrete as placed does not meet Specification requirements or where there is other evidence that the quality of the concrete is below Specification requirements, core-boring tests will be made by the Engineer in accordance with the a. .-, jcable requirements of ASTM Designation C421C42M, Standard Method of obtaining and Testing Drilled Cores and Sawed Beams of concrete", If the concrete in the structure will be more than superficially wet under service conditions, the cores shall be immersed in water for at least 48 hours and tested wet. In the event that the core-boring test Indicates that the concrete placed does not conform to the Drawings and Specifications, measures as prescribed by the Engineer shall be taken to correct the deficiency. However, the Engineer shall h9ve the authority to prescribe such corrective measures (and the Contractor shall take such measures) if in the Engineer's opinion the results of the test specimens, without coring, warrant such action. If a strength deficiency is found and is due to the Contractor's fault or negligence, the entire cost of replacing faulty concrete shall be borne by the Contractor.

7.23 Measurement and Payment

7.23.1 Concrete

a) Measurement will be made for the volume of concrete acceptably placed in the Permanent Works within the lines and grades as shown on the Drawings. and not as batched, or as directed by the Engineer. Where concrete is placed upon earth or blinding concrete layer, measurement will be made to the formation lines and grades show on the Drawings c . .AS otherwise directed and approved by the Engineer. No deductions will be made for or beveled edges or for space occupied by reinforcing steel. No deduction will be made for voids, piping, electrical conduits or any other embedded items which are each less than 100 square inches in cross-section. No measurement will be made for concrete that is wasted-for any reason or that is rejected.

b) All concrete required for work under these specifications shall be included in the unit rates tendered in the Bill of Quantities for the appropriate item in which such concrete is incorporated, The unit rates tendered for such work shall be deemed to cover all costs of concrete, other than reinforcing steel which is measured separately, including, but not limited to furnishing water, sand and aggregates, curing/sealing compound, joint sealants forms and form oil or compound and also including all operations, but not limited to, batching, mixing, temperature control, transportation, preparation for placing, placing, curing, protection, finishing and repairing concrete surfaces, installing and removing forms, shuttering, scaffolding and preparation of construction joints, and carrying out all tests and other operations, procedures, stipulations and requirements set forth herein or otherwise related to the item.

c) No payment will be made for the concrete used for casting concrete specimens for testing, their cuing, transportation to the laboratory and their testing. No additional payment except that mentioned in the respective BOQ Items will be make to the contractor for any change in mix design of concrete to achieve the required strength.

d) Admixtures, if used, shall be paid as prime cost item

e) No measurement for payment will be made for trowel finish of new concrete surfaces

f) Cost of all above items of work shall be deemed to be included in the quoted unit rates of respective concrete items of the BOQ.

7.23.2 Bituminous Protection

a) Bituminous protection as specified in Clause 5.19 shall be measured by net area

covered in final coat of applied surface in accordance with the specifications to the limits shown on the Drawings or as ordered by the Engineer, irrespective of whether it is horizontal vertical sloping or curved surfaces. No measurement will be made for individual coats.

b) Payment will be made at unit rate quoted in the BOO for this item as measured above

7.23.3 Joints

a) Construction Joint.
b) No measurement and payment shall be made for Construction joints provided.
c) Expansion Joint

Measurement of Expansion joints shown on the Drawings and as described herein above. shall be made in linear feet of the joints acceptably formed according to the length shown on the Drawings Payment for expansion joint shall be made according to the rate tendered in the Bill of Quantities per linear foot of the joint which shall be deemed to cover all costs including supplying and installing the joint filler, joint sea) and all other works related to the BOO item for providing and filling expansion joints.

11. PAINTING

11.1 Definition.

By painting is meant the application of paint, varnish, enamel and other protective coating in a liquid form to the surface of wood, metal, brick, or other material to form a thin coating or film which solidifies and strict to the surface.

11.2 Painting Iron work remain under water.

Preparation of Surface and Application of paint.

Unless otherwise specified, the surface shall be prepared accord to specification No: 27.9 for painting iron work above water.
The paint shall be applied hot as soon as the surface is cleaned.
Subsequent costs shall be applied only after the previous one has dried.

11.2.1 Painting Material.

Painting material shall be red oxide for the priming coat and black bitumen coats for the rest layers.

11.2.2 Numbers of Coats.

First coat of red oxide shall be applied on the prepared surface and tow other coats of black bitumen shall be applied over first coat of red oxide to protect the metal surface fully.

10.2.3 Protection.

Work thus painted shall not be immersed in water until it has dried up: one week shall generally sufficient for this purpose depending upon the weather.

10.2.4 Other Respects.

In all other respects not specified here it shall conform to specification No: 27.9 for painting work above water.

11.3 PAINTING PLASTER

Preparation of Surface.

All loose and flaking material shall be removed from old walls by scraping or wire brushing and the surface shall be carefully smoothed and cleared.
All dust, dirt, oil, grease or efflorescence shall be carefully removed
To ensure the uniform appearance to the finished work and to make a lime plastered surface non-absorbent, the surface, if not previously whitewashed, shall be painted with glue size or other-wise, with boiled linseed oil and thin size, tinged with red lead.

11.3.1 Priming Coat.

Having prepared the surface a priming coat composed of equal parts of white and red lead mixed in boiled linseed oil to the desired consistency, shall be applied.
When priming coat dries up, all cracks, holes and such other defects shall be filled up with a mixture of 1 part white lead and 3 parts ordinary putty.
The surface shall then be rubbed with pumice stone or sand paper and dusted clean.

11.3.2 2nd & 3rd Coats.

2nd coat shall consist of white lead and boiled linseed oil.
3rd coat shall consist of white lead tinted to approach the desired colour and mixed with raw linseed oil as a carrier and a small proportion of turpentine as drier.

11.3.3 Measurements.

The plaster painting shall be measured by the surface area. The unit of measurement shall be 100 sft.

12. SURFACE RENDERINGS

12.1 Plastering.

Plaster is a material used in plastic state, which can be trowelled to form a hard covering for interior or exterior surfaces, walls, ceilings etc. in any building or structure.

12.2 Surface Preparation.

A stiff wire brush is used to remove all loose dust from joints and surface is then thoroughly washed with water. Plastering should not be done on too much wet walls, because the results will not be satisfactory.

12.2.1 Coats.

Plaster may be applied in one, two or three coats; two are usually sufficient, but three should be applied only on wood or metal lathing or on very rough, uneven background. The thickness of the 1st coat has to be just sufficient to fill up all unevenness in the surface. The second and subsequent coats or thinner than the first, and no single coat has more than half an inch of thickness because thick coat shrink more and crack.

12.2.2 Material.

Various materials employed for plastering have been described in details in chapter in 19 (Mortar). A rich mix tends to develop large cracks; a weaker one develop finer and distributed cracks. A strong coat never applied over a weaker one since the latter would be unable to restrain its movement.

12.2.3 Cement Plaster.

Cement plaster is done exactly in the same manner as described above. The mortar is sometimes gauged with fat lime to improve its properties. Cement / lime / sand mortar hardens slowly and reduces the incidence of cracks; the addition of lime also makes for easier application. Send used should not be very fine. The plastered surface is kept wet and allowed to dry slowly, avoiding draughts and exposure to excessive heat from sunlight for several days so as to prevent it from cracking.

12.2.4 Mortars for Plastering.

The following proportions (by volume) of dry material are suggested

	Cement	Sand	Lime Paste
General	1	2 to 6	
Watertight mortar	1	2 to 3	1/3 to 1/2
Under coat	1	4 to 6	1
Finishing coat	1	9	2
Watertight finishing	1	10 to 12	3

12.3 POINTING

The surface of the work is prepared as explained under "Plastering". When commencing masonry each day, the first thing to be done, if the surface is to be subsequently pointed, is to rake out the face joints of all masonry finished the previous day. The joints are properly wetted in old work before pointing; for the mortar will not stick to a dry surface. The work pointed is kept wet for at least three days. Flush pointing is used for floors and all vertical and horizontal joints in walls which are to be whitewashed.

Normally pointing is done with mortar having the following mix ratios:-

	Cement	Sand	Lime Paste	Surkhi
Outside work	1	1 to 3	--	--
	1/3	--	1	1 to 2
	--	1	1	1/2 to 1

12.4 *Colour Washing.*

Colour washing is nothing more than a lime wash coloured with suitable pigments and treated to give a desired tint. It is applied exactly in the same fashion as the white wash, the old paint is scraped off or a coat of white wash is applied before the new colour is given. Gum or rise water is added as in white washing.

At all corner alternate courses of bricks shall be laid header on face and stretcher wise so as to bond the two walls well together.

8.2.9 ***Plumb Bobs and Straight Edges.***

All brick work shall be truly plumbed and each set of brick courses shall be checked with plumb bob and straight edge.

8.2.10 ***Face Work.***

All face work shall be finished with neat drawn joints and pointed out if it has not be plastered. If it has to be plastered the joints shall be raked out before any plaster is laid on. For face work the bricks shall be of true adages, uniform colour and correct dimensions.

8.2.11 ***Joining Works***

When fresh masonry is to join masonry that has partially or fully set, the exposed joining surface of the set masonry shall be cleaned, roughened and wetted so as to effect the best possible bond with the new work. All loose bricks and mortar shall be removed.

8.2.12 ***Striking of Joints.***

Where in the case of brick work in lime or cement mortar, pointing or plastering to the face work is not provided as a separate item the joints in face work shall be struck. This operation shall be paid for separately.

8.2.13 ***Protection Watering.***

All brick shall be protected during construction from the effects of rain and frost by suitable covering. The brick work laid in cement or in cement and lime mortar shall be kept moist for a period of ten days.

8.2.14 ***Measurements.***

Brick work shall be measured by volume. The unit of measurement shall be 100 Cft.

8. BRICK WORK (GENERAL)

8.1 Definition.

Unless other wise specified, all brick work shall be finished in a workmanlike manner, true to dimensions and grades shown on the drawings according to the following specification.

8.2 Classification.

Unless other wise specified, brick work shall be of the following 4 classes.

(i) First class brick work.
(ii) Second class brick work
(iii) Third class brick work
(iv) Sub-dried brick work
In this work the brick work at S.No: (i) shall be used.

8.2.1 Mortar.

Mortar shall be either as specified in the drawings and estimates or if not shown as specified or directed by engineer – in – charge. It shall be prepared in accordance with the relevant provision set fourth in specification No. 19.1 to 19.5 for the specified mortar.

8.2.2 Water.

Water to be used for making mortar and other works should be portable water free from all impurities.

8.2.3 Brick Bats.

No bats shall be used except where absolutely necessary for obtaining the dimensions of different courses or the specified bond.

8.2.4 Wetting Bricks.

Before use all bricks, except sun dried bricks, shall be soaked in clean water in a tank or pit for at least two hours as the water fills all the pores available in the brick.

8.2.5 Bond

Unless otherwise specified, all brick work shall be laid in English bond with frogs upward.

8.2.6 Laying of Bricks.

Each brick shall be set with both bed and vertical joint filled with mortar and thoroughly bedded in by tapping with handle of trowel.

8.2.7 Joints.

Horizontal joints shall be parallel and truly level. Vertical joints in alternate courses shall come directly over one and other. Thickness of joints unless otherwise specified, shall not be less then 1/4" and shall not be more 3/8" the height of 4 courses and 3 joints as laid shall not exceed more than 1 inch the height of four brick as piled dry one upon the other.

8.2.8 Corner.

8.2.8 *Corner.*

At all corners alternate courses of bricks shall be laid header wise and stretcher wise so as to bond the two walls well to gather.

8.2.9 ***Plumb Bobs and Straight Edges.***

All brick work shall be truly plumbed and each set of brick courses shall be checked with plumb bob and straight edge.

8.2.10 ***Face Work.***

All face work shall be finished with neat drawn joints and pointed out if it has not be plastered. If it has to be plastered the joints shall be raked out before any plaster is laid on. For face work the bricks shall be of true adages, uniform colour and correct dimensions.

8.2.11 ***Joining Works***

When fresh masonry is to join masonry that has partially or fully set, the exposed joining surface of the set masonry shall be cleaned, roughened and wetted so as to effect the best possible bond with the new work. All loose bricks and mortar shall be removed.

8.2.12 ***Striking of Joints.***

Where in the case of brick work in lime or cement mortar, pointing or plastering to the face work is not provided as a separate item the joints in face work shall be struck. This operation shall be paid for separately.

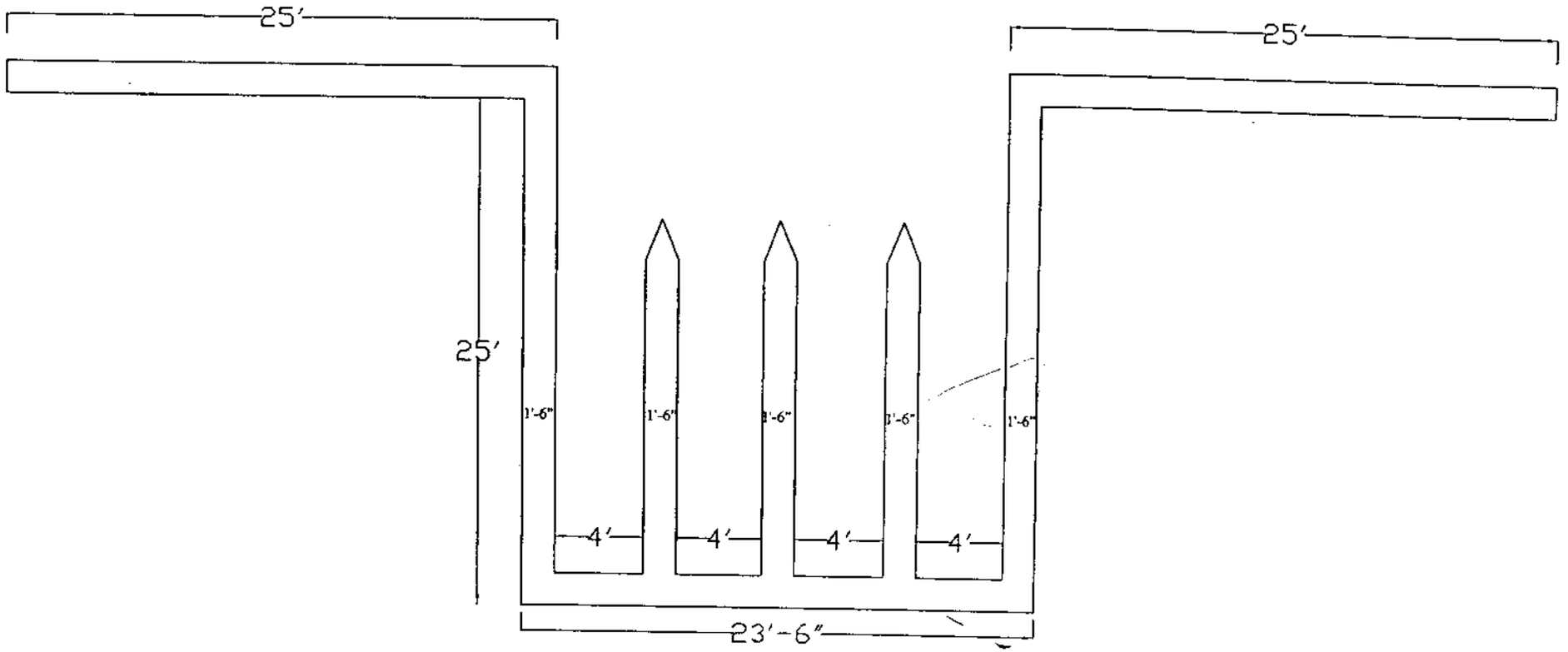
8.2.13 ***Protection Watering.***

All brick shall be protected during construction from the effects of rain and frost by suitable covering. The brick work laid in cement or in cement and lime mortar shall be kept moist for a period of ten days.

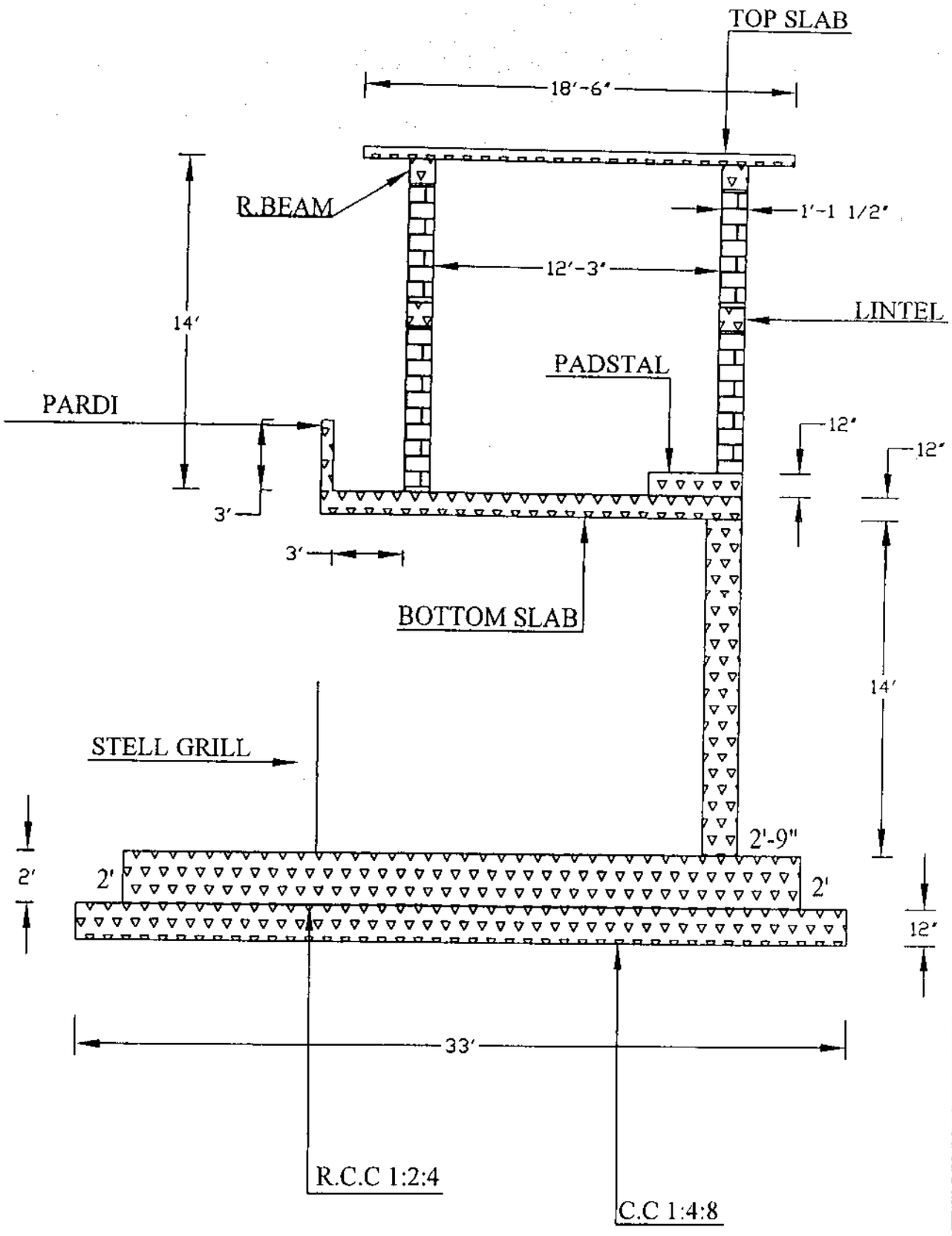
8.2.14 ***Measurements.***

Brick work shall be measured by volume. The unit of measurement shall be 100 Cft.

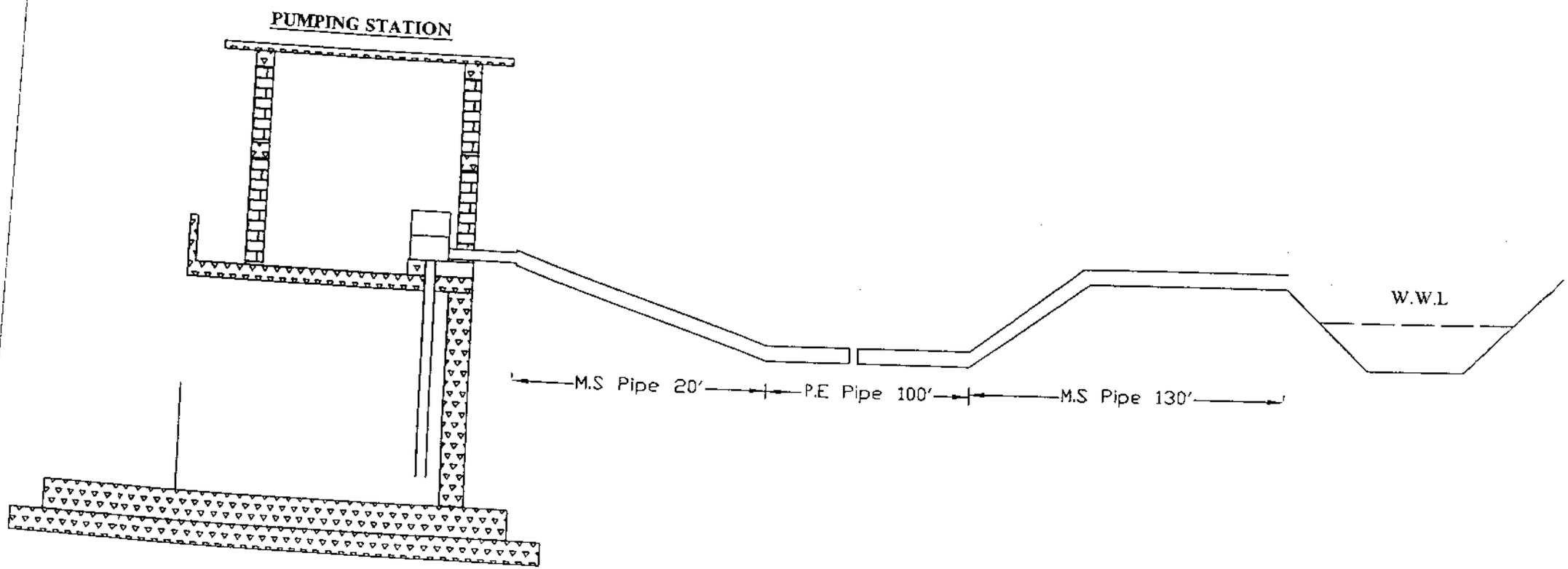
CONSTRUCTION OF PUMPING STATION



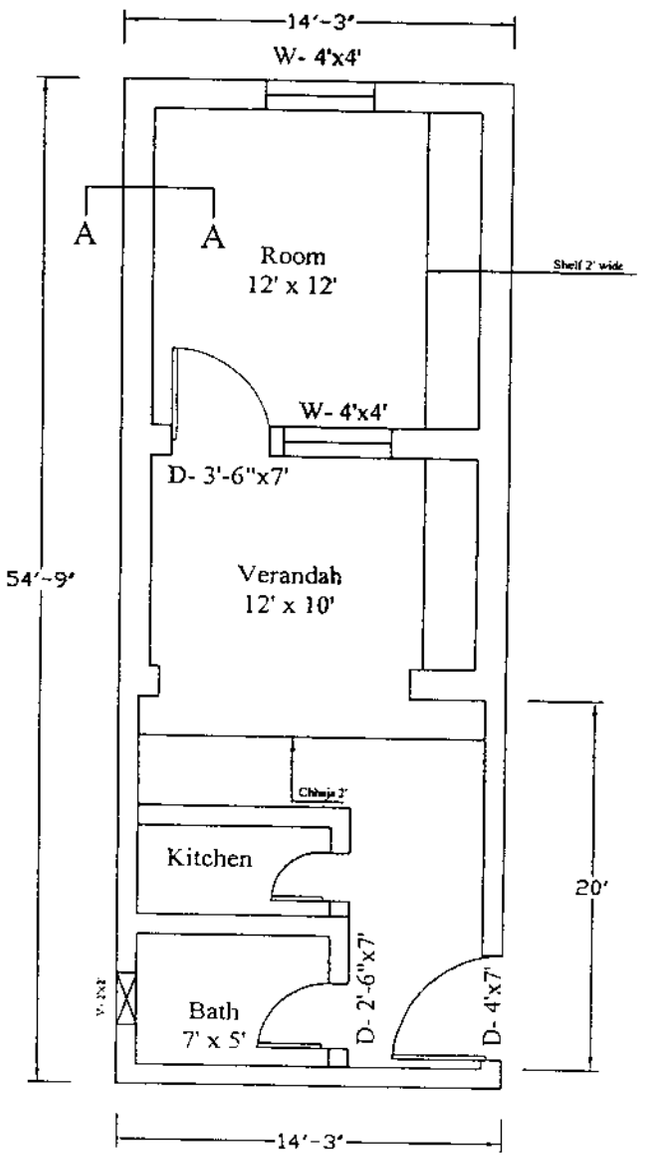
CONSTRUCTION OF PUMPING STATION

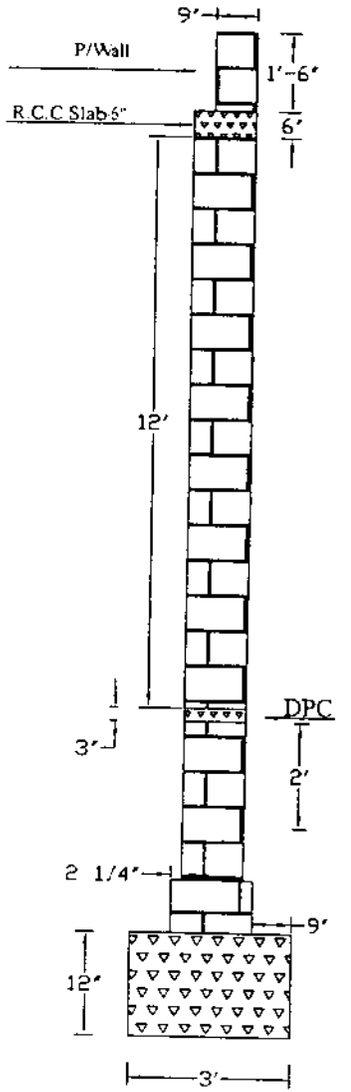


PLAN FOR CONSTRUCTION OF DIRECT DISPOSAL ARRANGEMENT FOR PUMPING STATION

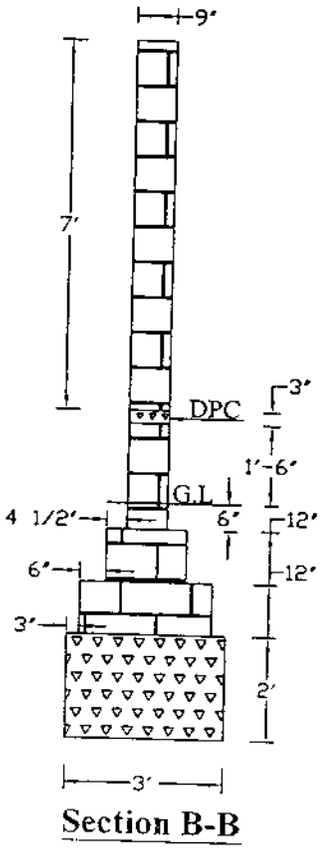


CONSTRUCTION OF OPERATOR QUARTER





Section A-A



Section B-B