NATIONAL ENGINEERING SERVICES PAKISTAN

(PVT) LIMITED (NESPAK)

(THE EMPLOYER)

GENERAL BIDDING DOCUMENTS FOR
GEOTECHNICAL INVESTIGATIONS

November 2024

National Engineering Services Pakistan (PVT.) Limited
NESPAK HOUSE 1-C Block N, Model Town Extension, Lahore.
Telephone: 0092-042-99231928 Fax: 0092-042-99231950

SUMMARY OF CONTENTS

INVITATION FOR BIDS

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Date: _____
Bid Reference No.: _____

1. The Employer, National Engineering Services Pakistan (Pvt) Limited (NESPAK), invites sealed bids from eligible firms or persons licensed by the Pakistan Engineering Council in the appropriate category and meeting the requirements of the qualification criteria for the works**,** viz Geotechnical Investigations for the project as mentioned in Bid Invitation Letter, the time duration for completion of project has been mentioned in Bidding Data/ Bid Invitation Letter including field and laboratory testing.

2. A complete set of Bidding Documents can be downloaded from NESPAK's website (www.nespak.com.pk) free of cost.

3. All bids must be accompanied by a Bid Security in the amount of 2 – 5 % of total bid price or as mentioned in Bid Invitation Letter and must be delivered to Head, GT & GE Division at same time & date or before as mentioned on Bidding Data/Bid Invitation Letter for opening of bids in the presence of bidders' representatives who choose to attend, at the same address.

INSTRUCTIONS
TO BIDDERS
&
BIDDING DATA

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INSTRUCTIONS TO BIDDERS

INSTRUCTIONS TO BIDDERS

(Note: These Instructions to Bidders (IB) alongwith Bidding Data will not be part of Contract and will cease to have effect once the Contract is signed).

A. GENERAL

IB.1 Scope of Bid & Source of Funds

1.1 Scope of Bid

The Employer, as defined in the Bidding Data, (hereinafter called "the Employer"), wishes to receive Bids for the Works summarized in the Bidding Data (hereinafter referred to as "the Works").

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 Employer has arranged funds from its own sources.

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) meeting the requirements specified in the qualification criteria of the works

IB.3 Cost of Bidding

3.1 The bidder shall bear all costs associated with the preparation and submission of its bid and the Employer will in no case be responsible or liable for those costs, regardless of the conduct or outcome of the bidding process.

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 & Schedules to Bid

Schedules to Bid comprise the following:

(i) Schedule A: Schedule of Prices
(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

3. Conditions of Contract & Contract Data

4. 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, if any

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/Employer at the Employer's/Engineer's address indicated in the Bidding Data.

5.2 The Engineer/Employer will respond to any request for clarification which it receives earlier than ten **(**10) days prior to the deadline for the submission of Bids. Copies of the Engineer/Employer's response will be forwarded to all prospective bidders, at least five (5) days prior to dead line for submission of Bids, who have received the Bidding Documents including a description of the enquiry but without identifying its source.

IB.6 Amendment of Bidding Documents

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

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 Employer.

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

C. PREPARATION OF BIDS

IB.7 Language of Bid

7.1 The bid prepared by the bidder and all correspondence and documents relating to the Bid, exchanged by the bidder and the Employer shall be written in the English language, provided that any printed literature furnished by the bidder may be written in another language so long as accompanied by an English translation of its pertinent passages in which case, for purposes of interpretation of the Bid, the English translation shall govern.

IB.8 Documents Comprising the Bid

8.1 The bid prepared by the bidder shall comprise the following components:

(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 rates and prices entered in the Schedule of Prices, 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/Bill of Quantities (as attached with Bid Invitation Letter/ as stipulated in Bidding Data) indicating the unit rates and prices of the Works to be performed under the Contract. Prices in the Schedule of Prices/Bill of Quantities shall be entered keeping in view the instructions contained in the Preamble to Schedule of Prices.

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/Bill of Quantities shall be quoted by the bidder in the currency as stipulated in Bidding Data.

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/Manufacturer must possess and provide evidence of its capability and the experience as stipulated in Bidding Data and the Qualification Criteria stipulated 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 Employer 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 in the amount stipulated in Bidding Data in Pak. Rupees in the form of Deposit at Call or a Bank Guarantee issued by a Scheduled Bank in Pakistan or an insurance company having alteast AA rating from PACRA/JCR in favour of the Employer valid for a period up to twenty eight (28) days beyond the bid validity date.

13.2 Any bid not accompanied by an acceptable Bid Security shall be rejected by the Employer 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 when the bidder has furnished the required Performance Security, pursuant to Clause IB.21 and signed the Contract Agreement, pursuant to Sub-Clauses IB.20.2 & 20.3.

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 to:

(i) furnish the required Performance Security in accordance with Clause IB.21, or

(ii) sign the Contract Agreement, in accordance with Sub-Clauses IB.20.2 & 20.3.

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

14.3 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.

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

14.5 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 authorising 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.

14.6 The Bid shall be delivered in person or sent by registered mail at the address to Employer as given in Bidding Data.

D. SUBMISSION OF BID

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

15.1 Bids must be received by the Employer at the address/provided in Bidding Data not later than the time and date stipulated therein.

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

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

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

15.5 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 Sub-Clause IB.13.5(a).

E. BID OPENING AND EVALUATION

IB.16 Bid Opening, Clarification and Evaluation

16.1 The Employer will open the bids, in the presence of bidders' representatives who choose to attend, at the time, date and location stipulated in the Bidding Data.

16.2 The bidder's name, Bid Prices, any discount, the presence or absence of Bid Security, and such other details as the Employer at its discretion may consider appropriate, will be announced by the Employer at the bid opening. The Employer 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/Employer 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.

16.4 (a) Prior to the detailed evaluation, pursuant to Sub-Clauses IB.16.7 to 16.9, the Engineer/Employer will determine the substantial responsiveness of each bid to the Bidding Documents. For purpose of these Clauses, a substantially responsive bid is one which conforms to all the terms and conditions of the Bidding Documents without material deviations. It will include to determine 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 Employer 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 may be waived by Employer, provided such waiver does not prejudice or affect the relative ranking of any other bidders.

16.7 The Engineer/Employer will evaluate and compare only the bids previously determined to be substantially responsive pursuant to Sub-Clauses 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 Sub-Clause 16.8 herein below.

(a) 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.

(b) Commercial Evaluation

It will be examined in detail whether the bids comply with the commercial/contractual conditions of the Bidding Documents. It is expected that no material deviation/stipulation shall be taken by the bidders.

16.8 Evaluated Bid Price

In evaluating the bids, the Engineer/Employer 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 Sub-Clause 16.4 hereof.

(ii) making an appropriate price adjustment for any other acceptable variation or deviation.

(iii) making an appropriate price adjustment for Deviations in terms of Payments (if any and acceptable to the Employer).

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

16.9 Evaluation Methods

Pursuant to Sub-Clause 16.8, Para (ii), and (iii) following evaluation methods for price adjustments will be followed:

(i) Price Adjustment for Technical Compliance

The cost of making good any deficiency resulting from technical non compliance will be added to the Corrected Total Bid Price for comparison purposes only. The adjustments will be applied taking the highest price quoted by other bidders being evaluated in detail in their original Bids for corresponding item. In case of non availability of price from other bidders, the price will be estimated by the Engineer/Employer.

(ii) Price Adjustment for Commercial Compliance

The cost of making good any deficiency resulting from any quantifiable variations and deviations from the Bid Schedules and Conditions of Contract, as determined by the Engineer/Employer will be added to the Corrected Total Bid Price for comparison purpose only. Adjustment for commercial compliance will be added to the Corrected Total Bid Prices.

(iii) Price Adjustment for Deviation in Terms of Payments

Refer to Bidding Data

IB.17 Process to be Confidential

17.1 Subject to Sub-Clause IB.16.3 heretofore, no bidder shall contact Engineer/Employer 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 Employer. The evaluation result shall be announced at least ten (10) days prior to award of Contract. The announcement to all bidders will include table(s) comprising read out prices, discounted prices, price adjustments made, final evaluated prices and recommendations against all the bids evaluated.

17.2 Any effort by a bidder to influence Engineer/Employer 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 not later than fifteen (15) days after the announcement of the bid evaluation result, however, mere fact of lodging a complaint shall not warrant suspension of procurement process.

F. AWARD OF CONTRACT

IB.18. Post Qualification

18.1 The Employer, at any stage of the bid evaluation, having credible reasons for or *prima facie* evidence of any defect in supplier's or contractor's capacities, may require the suppliers or 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 therefor 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 Clause IB.11, as well as such other information required in the Bidding Documents.

IB.19 Award Criteria & Employer's Right

19.1 Subject to Sub-Clause IB.19.2, the Employer 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 Clause IB.18.

19.2 Not withstanding Sub-Clause IB.19.1, the Employer 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 Employer'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.

IB.20 Notification of Award & Signing of Contract Agreement

20.1 Prior to expiration of the period of bid validity prescribed by the Employer, the Employer will notify the successful bidder in writing ("Letter of Acceptance") that his bid has been accepted.

20.2 Within seven (7) days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer 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 Employer and the successful bidder shall be executed within seven (7) days of the receipt of Form of Contract Agreement by the successful bidder from the Employer.

IB.21 Performance Security

21.1 The successful bidder shall furnish to the Employer 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.

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.

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 Federal Government procurement contracts exceeding Rupees ten (10) million. Failure to provide such Integrity Pact shall make the bid non-responsive.

BIDDING DATA

Instructions to Bidders
Clause Reference

1.1 **Name of Employer**

National Engineering Services Pakistan (Pvt.) Limited (NESPAK) or as per Bid Invitation Letter

Brief Description of Works

The works comprise of Geotechnical Investigations for proposed project as mentioned in the Bid Invitation Letter:

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) Meeting the requirements specified in the qualification criteria for the works.

5.1 (a) Employer's address:
Head, GT & GE Division, NESPAK HOUSE, 1-C Block N, Model Town Extension, Lahore. Telephone: 0092-042-99231917 Fax: 0092-042-99231950 or as per Bid Invitation Letter

(b) Engineer's address:
- Same as above -

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

11.2 The bidder/manufacturer has the financial, technical and production capability necessary to perform the Contract.

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**

Not less than 2 % of Total Bid Price or as required in Bid Invitation Letter

14.1 **Period of Bid Validity**

Three (3) months

14.4 **Number of Copies of the Bid to be submitted**

One (1) original only

14.6 **(a) Employer's Address for the Purpose of Bid Submission**

Head, GT & GE Division, NESPAK HOUSE, 1-C Block N, Model Town Extension, Lahore. Telephone: 0092-042-99231917 Fax: 0092-042-99231950 or as mentioned in bid invitation letter

15.1 **Deadline for Submission of Bids**

As stipulated in bidding data/bid invitation letter

16.1 **Venue, Time, and Date of Bid Opening**

Venue: GT & GE Division, NESPAK House.
Time & Date: As stipulated in bidding data/bid invitation letter

16.4 **Responsiveness of Bids**

(i) the Bid is valid till required period,
(ii) the Bid prices are firm during currency of contract (if it is a fixed price bid)
(iii) completion period offered is within specified limits,
(iv) the Bidder/Manufacturer is eligible to Bid and possesses the requisite experience capability and qualification.
(v) the Bid does not deviate from basic technical requirements and
(vi) the Bids are generally in order, etc.

FORM OF BID AND SCHEDULES TO BID

FORM OF BID

(LETTER OF OFFER)

Bid Reference No. _____

Geotechnical Investigation for the Project as mentioned in Bid Invitation Letter

To:

Head, GT & GE Division
National Engineering Services Pakistan (Pvt) Limited
NESPAK HOUSE,1-C Block N, Model Town Extension, Lahore.
Telephone: 0092-042-99231917 Fax: 0092-042-99231950

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 Programme of Works
- Schedule E to Bid: Method of Performing Works
- Schedule F to Bid: Integrity Pact

SCHEDULE – A TO BID

SCHEDULE OF PRICES

PREAMBLE TO SCHEDULE OF PRICES

1. General

1.1 The Schedule of Prices/Bill of Quantities 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.

1.3 Schedule of Prices/Bill of Quantities will be provided along with Bid Invitation Letter.

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 Systeme Internationale d' Unites (SI Units).

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 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 Employer 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.

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 Employer in the format of Schedule of Prices.

The bidder shall recognize such elements of the costs which he expects to incur in 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.

6. Provisional Sums

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/Employer. The Contractor will only receive payment in respect of Provisional Sums if he has been instructed by the Engineer/Employer to utilize such sums.

SCHEDULE - B TO BID

*SPECIFIC WORKS DATA

(To be prepared and incorporated by the Employer)

SCHEDULE – C TO BID

WORKS TO BE PERFORMED BY SUBCONTRACTORS

The bidder will do the work with his own resources 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)

SCHEDULE – D TO BID

PROPOSED PROGRAMME OF WORKS

Bidder shall provide a programme in a bar-chart 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.

SCHEDULE – E TO BID

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 constructional and erectional plant, 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.

- Organisation chart indicating head office & field office personnel involved in management, supervision and engineering of the Works to be done under the Contract.

SCHEDULE – F TO BID

INTEGRITY PACT

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

Contract No._____ Dated _____
Contract Value: _____
Contract Title: _____

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

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

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

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

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

Name of Buyer: ……	Name of Seller/Supplier: ……
Signature: ……	Signature: ……
[Seal]	[Seal]

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

1.1.1 "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 Employer'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 Employer's drawings of the Works as listed in the Contract Data, and any Variation to such drawings.

Persons

1.1.4 "Employer" 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 Employer) any assignee.

1.1.6 "Party" means either the Employer 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 "Employer'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 Employer 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/Employer 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 Employer 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 organisations. 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 EMPLOYER

2.1 **Provision of Site**

The Employer shall provide the Site and right of access thereto at the times stated in the Contract Data.

2.2 **Permits etc.**

The Employer 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/Employer's Instructions**

The Contractor shall comply with all instructions given by the Employer or the Engineer, if notified by the Employer, 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/Employer shall affect the Contractor's obligations.

3. ENGINEER'S/EMPLOYER'S REPRESENTATIVES

3.1 **Authorized Person**

The Employer 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 Employer shall notify the Contractor, in writing, the precise scope of the authority of such authorized person at the time of his appointment.

3.2 **Engineer's/Employer's Representative**

The name and address of Engineer's/Employer's Representative is given in Contract Data. However the Contractor shall be notified by the

Engineer/Employer, 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 Employer for such appointment which consent shall not be unreasonable withheld by the Employer. 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 Employer 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 Employer.

4.4 Performance Security

The Contractor shall furnish to the Employer within fourteen (14) days after receipt of Letter of Acceptance a Performance Security at the option of the bidder, in the form of Bank Draft or Bank Guarantee or an insurance company having alteast AA rating from PACRA/JCR for the amount and validity specified in Contract Data.

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/Employer all designs prepared by him. Within fourteen (14) days of receipt the Engineer/Employer shall notify any comments or, if the design submitted is not in accordance with the Contract, shall reject it stating the reasons. The 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/Employer 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/Employer shall be responsible for the Specifications and Drawings.

6. EMPLOYER'S RISKS

6.1 **The Employer's Risks**

The Employer'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 Employer 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 Employer's personnel or by others for whom the Employer 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 Employer and accepted by the Employer.

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/Employer 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 Employer/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 Employer/Engineer for a reasonable extension in the time for the completion of Works. Subject to the aforesaid, the Employer/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 Employer/Engineer within such period as may be prescribed by the Employer/Engineer for the same; and

the Employer shall 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 Employer for such failure shall be to pay the amount stated in the Contract Data (the sum of one percent (1%) per day of delay, to the maximum of the ten percent (10%) of the contract price) for each day for which he fails to complete the Works.

8. TAKING-OVER

8.1 Completion

The Contractor may notify the Engineer/Employer 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 Employer/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 Employer/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 Employer, 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 Employer/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 Employer/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 Employer 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/Employer 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 Employer/Engineer may issue Variation Order(s) in writing. Where for any reason it has not been possible for the Employer/Engineer to issue such Variations Order(s), the Contractor may confirm any verbal orders given by the Employer/Engineer in writing and if the same are not refuted/denied by the Employer/Engineer within seven (7) 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/Employer considers appropriate, or

e) if the Engineer/Employer 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 **Early Warning**

The Contractor shall notify the Engineer/Employer in writing as soon as he is aware of any circumstance which may delay or disrupt the Works, or which may give rise to a claim for additional payment.

To the extent of the Contractor's failure to notify, which results to the Engineer/Employer 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.

10.4. **Valuation of Claims**

If the Contractor incurs Cost as a result of any of the Employer's Risks, the Contractor shall be entitled to the amount of such Cost. If as a result of any Employer's Risk, it is necessary to change the Works, this shall be dealt with as a Variation subject to Contractor's notification for intention of claim to the Engineer/Employer within fourteen (14) days of the occurrence of cause.

10.5 **Variation and Claim Procedure**

The Contractor shall submit to the Engineer/Employer an itemised make-up 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/Employer shall check and if possible agree the value. In the absence of agreement, the Employer 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 47, be paid by the Employer to the Contractor within 30 days after such Interim Payment Certificate has been jointly verified by Employer and Contractor, or, in the case of the Final Certificate referred to in Sub Clause 60.8, within 60 days after such Final Payment Certificate has been jointly verified by Employer and Contractor; Provided that the Interim Payment shall be caused in 42 days and Final Payment in 60 days in case of foreign funded project. In the event of the failure of the Employer to make payment within the times stated, the Employer shall pay to the Contractor compensation at the 28 days rate of KIBOR+2% per annum in local currency and LIBOR+1% for foreign currency, upon all sums unpaid from the date by which the same should have been paid. The provisions of this Sub-Clause are without prejudice to the Contractor's entitlement under Clause 69.

(b) **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; and

b) the percentage of the value of Materials and Plant reasonably delivered to the Site, as stated in the Contract Data, subject to any additions or deductions which may be due.

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

11.3 **Interim Payments**

Within a period not exceeding seven (7) 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) days from the said date of submission by the Contractor, the Employer shall pay to the Contractor the sum verified by the Engineer less retention money at the rate stated in the Contract Data.

11.4 **Retention**

Retention money shall be paid by the Employer to the Contractor within fourteen (14) 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 Engineer to verify and the Engineer shall verify the same within fourteen (14) days from the date of submission and forward the same to the Employer together with any documentation reasonably required to enable the Employer to ascertain the final contract value.

Within sixty (60) days from the date of receipt of the verified final account from the Engineer, the Employer shall pay to the Contractor any amount due to the Contractor. While making such payment the Employer may, for reasons to be given to the Contractor in writing, withhold any part or parts of the verified amount.

11.6 **Currency**

Payment shall be in the currency stated in the Contract Data.

12. DEFAULT

12.1 **Default by Contractor**

If the Contractor abandons the Works, refuses or fails to comply with a valid instruction of the Engineer/Employer or fails to proceed expeditiously and without delay, or is, despite a written complaint, in breach of the Contract, the Employer 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 Employer's notice, the Employer may by a second notice given within a further twenty one (21) days, terminate the Contract. The Contractor shall then demobilise from the Site leaving behind any Contractor's Equipment which the Employer instructs, in the second notice, to be used for the completion of the Works at the risk and cost of the Contractor.

12.2 **Default by Employer**

If the Employer 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 Employer's receipt of this notice, the Contractor may suspend the execution of all or parts of the Works.

If the default is not remedied within twenty eight (28) days after the Employer'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 Employer 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 Employer is entitled,

c) if the Employer has terminated under Sub-Clause 12.1 or 12.3, the Employer 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 Employer's/Engineer's issuance of Certificate of Completion under Sub-Clause 8.2. Responsibility shall then pass to the Employer. 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 Employer's Risks, the Contractor shall indemnify the Employer, 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/Employer immediately. If necessary, the Contractor may suspend the execution of the Works and, to the extent agreed with the Employer 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 Employer 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 Employer's Risks under Sub-Clause 6.1. The policies shall be issued by insurers and in terms approved by the Employer. The Contractor shall provide the Engineer/Employer 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 Employer 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 Employer 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 Employer 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 Employer 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 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.

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 thereunder 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 Employer shall be entitled to:

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

(b) terminate the Contract; and

(c) recover from the Contractor any loss or damage to the Employer as a result of such termination or of any other corrupt business practices of the Contractor or any of his 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 Employer 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 Employer under Sub-Para (a) and (c) of this Sub-Clause.

CONTRACT DATA

Sub-Clauses of
Conditions of Contract

1.1.4 **The Employer** means
National Engineering Services Pakistan (Pvt) Limited (NESPAK) **or as per Contract**

1.1.5 **The Contractor** means
As per letter of award

1.1.7 **Commencement Date** means the date of issue of Engineer's Notice to Commence or as per Letter of award

1.1.9 **Time for Completion** as per Letter of Award

1.1.20 **Engineer**
Head, GT & GE Division NESPAK, Lahore or his authorized representative

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

2.1 **Provision of Site:** On the Commencement Date*

3.1 **Authorised Person:** Head, Foundations and Pavement Section GT & GE Division, NESPAK or his authorized representative / Project Manager

3.2 **Name and address of Engineer's/Employer's representative**

Head, GT & GE Division.

NESPAK House, 1-C, Block-N Model Town Extension, Lahore

Telephone: 0092-042-99231917 Fax: 0092-042-99231950

4.4 **Performance Security Amount and Validity**

An amount of 5% of the contract price shall be made upon completion of entire work till final settlement of bills.

5.1 **Requirements for Contractor's design (if any):**

Specification Clause No's: _____

7.2 **Programme:**

Time for submission: as per Letter of Award

Form of programme: _____ (Bar Chart/CPM/PERT or other)

9.1 **Remedying Defects**

_____

11.1 **(a) Terms of Payments**

Payment of Contract Price shall be made in the following manners**:**

If the contractor fails to achieve completion of the work within the prescribed time, then you shall pay to NESPAK as liquidated damages for such default and not as penalty, the sum of one percent (1%) per day of delay, to the maximum of the ten percent (10%) of the contract price.

Payment of the entire amount shall be made, upon submission of an invoice by you, upon 100 % completion of work, provided the work is carried out to the entire satisfaction of Engineer.

11.6 **Currency of payment:** Pak. Rupees

15.3 **Arbitration**

Place of Arbitration: As per Letter of Award

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 Employer)

Name of Guarantor (Scheduled Bank in Pakistan) with address:_____
Name of Principal (Bidder) with address:_____
_____
Penal 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 "Employer") in the sum stated above, for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Principal has submitted the accompanying Bid numbered and dated as above for _____ (Particulars of Bid) to the said Employer; and

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

(1) that the Bid Security shall remain valid for a period of twenty eight (28) 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 Employer 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 Employer 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 Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified 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 Employer the said sum stated above upon first written demand of the Employer without cavil or argument and without requiring the Employer to prove or to show grounds or reasons for such demand, notice of which shall be sent by the Employer by registered post duly addressed to the Guarantor at its address given above.

PROVIDED ALSO THAT the Employer 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 Employer 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 _____ 20 _____ between _____(hereinafter called the "Employer") of the one part and _____ (hereinafter called the "Contractor") of the other part.

WHEREAS the Employer is desirous that certain Works, viz _____ should be executed by the Contractor and has accepted a Bid by the Contractor for the execution and completion of such Works and the remedying of any defects therein.

NOW this Agreement 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 alongwith Schedules to Bid;
   (c) Conditions of Contract & Contract Data;
   (d) The priced Schedule of Prices;
   (e) The Specifications; and
   (f) The Drawings

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

4. The Employer hereby covenants to pay the Contractor, in consideration of the execution and completion of the Works as per provisions of the Contract, the Contract Price or such other sum as may become payable under the provisions of the Contract at the times and in the manner prescribed by the Contract.

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

Signature of the Contactor	Signature of the Employer
_____	_____
(Seal)	(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:	Witness:
_____	_____
(Name, Title and Address)	(Name, Title and Address)

FORM OF BANK GUARANTEE FOR ADVANCE PAYMENT

Guarantee No._____

Executed on_____

(Letter by the Guarantor to the Employer)

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

_____

_____ (Particulars of Contract), with

_____

_____ (hereinafter called the Contractor).

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

AND WHEREAS the Employer has asked the Contractor to furnish Guarantee to secure the 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 Employer 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 Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Employer shall be the sole and final judge, as aforesaid, on the part of the Contractor, shall be given by the Employer to the Guarantor, and on such first written demand payment shall be made by the Guarantor of all sums then due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall 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.

NOT USED

_____
Guarantor (Scheduled Bank)

Witness:

1. _____

_____
Corporate Secretary (Seal)

2. _____

_____
(Name, Title & Address)

1. Signature _____
2. Name _____
3. Title _____

_____
Corporate Guarantor (Seal)

TECHNICAL SPECIFICATIONS

GEOTECHNICAL INVESTIGATIONS

1. GENERAL

1.1 Brief description of the site

_____

1.2 Access to the site

_____

1.3 Scope of the contract

The purpose of the work specified herein is to determine the type, nature, thickness, structure and texture of the various subsurface strata and the conditions and the engineering characteristics of the subsurface materials as they exist to the depth and at the locations specified. This is to be accomplished by means of light percussion boring/hand augering/straight rotary drilling, and excavation of test pits, in situ testing and collection of disturbed/undisturbed samples from the project site. The selected samples of soil and water shall be tested in the approved laboratory for their physical, chemical and engineering properties. The Bill of Quantities for geotechnical investigations is given in Bidding Data/Bill Invitation Letter. The locations of boreholes and testpits will be finalized by the Engineer in the field.

1.4 Work under instructions of engineer

The contractor shall carry out the specified works under the supervision of the Engineer, his Representative or the Representative's assistants.

1.5 Mobilization

Within two (02) days of receiving a written order to commence the works or as per letter of award, the contractor shall mobilize to site for the execution of work as per agreed schedule. Mobilization shall consist of the delivery at the site of all plant, equipment, accessories, spares, materials, and supplies to be furnished by the Contractor; the complete assembly of all such plant and equipment in a satisfactory working order and satisfactory storage at the Site of all materials and supplies. The equipment mobilized shall include but not limited to the items listed in Clause 1.6.

1.6 List of equipment which must be included but not limited to in items mobilized by the Contractor.

	Description	Minimum quantity
1)	Rotary/Percussion drilling rig capable of drilling down to maximum required depth with water or bentonite mud, complete with all necessary casing, tools, rods and drilling equipment e.t.c.	As mentioned in bill of quantities
2)	Casing of different diameters capable of boring/drilling upto maximum required depth in overburden. Minimum diameter of hole shall not be less than 6 inch at the bottom of the hole.	As per project requirement
3)	Hydraulic jacks with all accessories and spares for the extraction of casings after completion of holes.	As per project requirement
4)	Hand auger with all accessories capable to drill a borehole upto maximum required depth	As per project requirement
5)	Denison sampler	As per project Requirement
6)	Pitcher sampler	As per project requirement
7)	Soil sampling tubes for Denison & Pitcher samplers	As per project requirement
8)	Open drive sampler tubes, shelby tubes	As per project requirement
9)	Standard penetration test equipment including AW, B rods and split spoon samplers and containers for sample preservation	As per project requirement
10)	Electrically operated sounder for groundwater level measurements	As per project requirement
11)	Field density test apparatus with accessories	As per project requirement
12)	Wooden box for the preservation of block samples	As per project requirement

1.7 Permission to start the works

The Contractor shall not be allowed to commence the works until he has mobilized all the equipment required to complete works as per BOQ and any delay caused thereby shall not be allowed as a basis of a claim for additional expenditure or an extension of

the time for completion of the Contract.

1.8 Demobilization

Demobilization shall consist of the removal from the site of all plant and equipment after completion of the work and leaving the site clear, clean and tidy to the satisfaction of the Engineer. Engineer's permission shall be sorted before demobilization from the site.

1.9 Plant and equipment

The Contractor shall keep on the site sufficient plant to meet the requirements of the work. The plant and equipment shall be in good operating condition and capable of efficiently performing the work as set forth.

1.10 Drillers and supervisory staff

The Contractor shall have on site, at all times, qualified, experienced, orderly and thoroughly competent persons including geotechnical engineers or engineering geologist who shall conduct and supervise drilling, boring operations, sampling, logging and in situ testing. The Contractor shall remove from the site any of his employees that in the opinion of the Engineer do not meet these requirements.

1.11 Setting up at each hole

The Contractor shall make all the necessary arrangements for setting up at the location of each hole, everything necessary for carrying out the work specified at that hole, and for the preparation and reinstatement of the work areas, improvement to access routes and all other temporary works.

1.12 Housing and storage

The Contractor shall make his own arrangements for housing of his personnel and storage of the equipment and supplies at the site. However, the Contractor shall provide a temporary site office properly furnished for the Engineer or Engineer's Representative.

1.13 Health, Safety and Environmental (HSE) Measures

a) The Contractor shall ensure that all necessary measures are undertaken to maintain good health of its staff and hygienic conditions at the job site.

b) The Contractor shall ensure the safety of all the personnel engaged in the WORK including the Employer and engineer supervising staff, and shall take necessary precautions and preventive measures to that end including the use of personal protective equipment (PPE) and safe working procedures.

c) The Contractor shall take effective steps to assure that during the Work no air, water or soil pollution is generated

1.14 Interference with others

It is possible that the Engineer may engage some other agency for the executions of other investigations at the Project site, which will start within the period of this contract. The Contractor shall ensure that neither he nor his staff cause any interference with as well as delays to any other agency working on or near the site and that his plant and equipment or supplies shall not prevent or hinder the movement of personnel or of plant, equipment or supplies belonging to others who are lawfully in the area. If the Contractor receives any complaint either verbally or in writing that his operations have caused or causing delays or hindrance to others, he shall inform the Engineer immediately and pass on the original or a copy of any written complaint received. Likewise the Engineer shall inform the Contractor of such complaint which he has received concerning the Contractor's operations.

1.15 Measurement of quantities

The quantities shown in Bill of Quantities are only approximate. The payment shall be made on the basis of actual work performed in accordance with the specifications.

1.16 Submission of Field Data

The Contractor shall supply complete field investigation data to the Engineer within the two (02) days after the completion of field work. This data shall include copies of all approved logs and test records prepared during the course of the contract including any alterations or amendments required by the Engineer. No separate payment shall be made for this work.

1.17 Order of work

The order of the execution of the work will be specified by the Engineer.

2 DEFINITIONS

2.1 Holes

Any borehole or drill hole is referred to generally as a hole

2.2 Boring

Boring shall mean advancing a hole using machine-driven bailer, chisel or clay-cutter. The rig used shall be called a boring rig and the hole formed shall be called a borehole.

2.3 Drilling

Drilling shall mean the use of a machine-driven rig for advancing a hole in rock or soil required with a rotary cutting tool. The hole formed shall be called a drill hole and the rig used shall be called a drilling rig, which term shall include a boring rig with auxiliary equipment for drilling.

2.4 Sample tube

A ‘Sample tube’ shall mean the container into which undisturbed soil is forced during sampling and in which the soil is extracted from the ground and stored, after sealing, against loss of moisture.

2.5 Sampler

A ‘sampler’ shall mean the sample tube and all the accessories that are required to obtain the disturbed or undisturbed sample of soil.

3. METHODS OF WORKING

3.1 Areas to be investigated

The limits of the project site and the approximate locations of the boreholes and tespits shall be indicated on Drawing, but the Engineer may change the locations within the limits of the area to be investigated during the progress of the work. The Engineer will specify from time to time during the Contract period the exact location and reference number of all holes/testpits, but locating the holes/testpits accurately in the field shall be the Contractor’s responsibility.

3.2 Boring

The Engineer will indicate the type and maximum depth likely for each hole before it is started, and the Contractor shall use the equipment necessary for continuing the hole to that depth.

3.3 Casing

A hole shall be cased in any stratum which is not sufficiently strong to stand unsupported, or when directed by the Engineer’s Representative.

The Contractor shall ensure that casings are of a suitable size and are inserted in such a manner so as to render them recoverable. The Contract Rates for boring and drilling shall be deemed to include the supply, insertion and recovery of casing and any damage, loss or delay caused by difficulty or failure in recovery of casing.

3.4 Removal of casing

Casing shall not be removed from any hole nor any filling introduced into a hole until permission is given by the Engineer. This permission will normally be given as soon as work in the hole is completed and the groundwater level has been measured in accordance with Clause 3.8 of Technical Specifications.

3.5 Display of material removed

The material removed from all holes, except for disturbed samples in their containers and undisturbed samples in their samplers shall be laid out in sequence on a clean dry board for examination by the Engineer. The material shall be displayed in such a manner that, when required by the Engineer, further small, disturbed samples can be taken unmixed with other material. No material shall be removed from the board until authorized by the Engineer. All the material displayed shall be protected from adverse effects of the weather including hot sun and rain.

3.6 Supplementary holes

Holes that are abandoned shall be supplemented by other holes adjacent to the original location. In addition, holes from which unsatisfactory samples have been obtained and/or in which unsatisfactory field tests have been performed due to the negligence of the Contractor shall be supplemented by other holes adjacent to the original location. The exact location of such supplementary holes shall be specified by the Engineer in the field.

Penetration to the depth where the unacceptable holes were abandoned or to the depths where unsatisfactory samples were obtained or unsatisfactory field testing was performed may be made by any method selected by the Contractor that in the opinion of the Engineer will permit satisfactory field testing and sampling below those depths. The deepening of the supplementary hole below the depth at which original hole was abandoned shall be carried out using only the specified method of advancing the hole.

No payment will be made for that portion of the supplementary hole above the depth paid for in the unacceptable hole.

3.7 Daily field records

Each day during the work on the Site, the Contractor shall hand over to the Engineer the original and a legible copy of the records of the previous day's work containing the following information in respect of each hole where work in progress.

a) Name of Contract.

b) Number, type and size of the hole

c) Date and hours worked on the Site

d) Brief description of the weather

e) Total depth of hole at the beginning and end of each shift

f) Make and type of machine in use

g) The groundwater levels in accordance with Clause 3.8 and the depths at which water inflows were encountered.

h) The approximate quantity of water poured into a hole and the time when it was done.

i) Diameter of the hole and depths of any reduction in diameter.

j) The length of hole for which casing was used and the diameter of such casing.

k) A full geotechnical description of each stratum encountered.

l) Depth below ground of each change of stratum

m) Reference number, depths and other details of all small and large disturbed samples, field moisture content samples and undisturbed samples (giving serial number and type of the sampler, length of sample recovered and number of blows used if driven).

n) Commencing and terminating depths of each drilling run, details of type of bit used and length of samples recovered.

o) Data obtained during in situ tests, together with the water level in the hole during the test on specified proformas.

p) Details of any instrumentation installed

q) Details of backfilling and grouting including the quantity of material used.

r) Details of delays and breakdowns.

s) Any other relevant information and details of any other operation for which the Contractor may require additional payments.

3.8 Ground Water level

Readings of groundwater levels in all holes and that the depth of the hole in progress shall be taken with an electrically operated sounder and by other means recorded in the daily field records and logs at the following times:-

a) Before work commences in the morning.

b) After work has finished in the evening, both before and after water (if any) is added to stabilize the hole.

c) When a hole has been completed.

d) Immediately prior to backfilling a hole

e) At the time of undisturbed sampling and standard penetration and other in situ tests.

f) At the completion of the field work.

An electrically operated sounder in proper working order shall be maintained at each hole where work is in progress whether or not water has previously been observed in that hole.

The level of the bottom of the hole and the bottom of the casing, if any, shall be measured and recorded at the same time as each water level reading.

The times when water levels are measured shall also be recorded.

If, at any time, the level of the water in a hole fluctuates, a record shall be kept of the fluctuation. If the hole 'makes or 'loses' water the Engineer shall be informed immediately.

Any addition of water to assist the advance of a hole shall be recorded and any extraordinary smell or color of the water and any other unusual circumstances shall be reported. Water shall not be added or removed from a hole when in the opinion of the Engineer such action might adversely affect undisturbed sampling and the results of in situ tests.

3.9 No additional payment for water level observations

The Contract Rates for drilling and boring shall be deemed to include the cost of taking and recording all water levels as specified in Clause 3.8.

3.10 Backfilling of holes

Boreholes shall be backfilled with grout as explained below or as directed by the Engineer: -

Grouting for backfilling holes shall consist of a mud formed by mixing one part by weight of bentonite with 10 parts of water, to which shall be added two parts by weight of cement after the bentonite and water have been thoroughly mixed. Alternatively, holes may be backfilled with purpose- made pellets of bentonite or bentonite/cement, provided they are of a size which, in the opinion of the Engineer is compatible with the size of hole. If there is no standing water in the hole, grout may be poured in from the top. If there is standing water in the hole, the grout shall be fed into the bottom of the hole by a tremie pipe, the end of which shall always be below the groundwater junction while grouting is being carried out.

Grout backfill shall be taken up to 30 cm below the original ground level. Any apparent loss of grout due to leakage or consolidation within one week shall be made-up with fresh grout and then the remaining depth of the hole shall be filled with concrete. No separate payment shall be made for this work and the contract rates for drilling shall be deemed to include cost of backfilling of boreholes.

3.11 Logs

Logs of boreholes/ drill holes/ testpits shall be provided on forms specified by the Engineer. They shall include descriptions of all strata including details of the soil macrofabric (such as frequency, orientation and nature of discontinuities) and details of samples taken, and an account of all observations and field tests. Logs of drill holes and boreholes shall include notes on the nature, quantity and color of the drilling fluid returns. All logs shall be subject to the approval of the Engineer and one draft copy shall be submitted to the Engineer, not more than two days after the hole is backfilled. Soil descriptions shall conform to ASTM designation D 2488-84 and classified according to ASTM designation D 2487-85. All depths and thicknesses of topsoil and strata shall be recorded in meters and all reduced levels shall be recorded in meters with respect to mean sea level.

3.12 Contractor's responsibility for records

The presence of the Engineer or any of his staff and their keeping separate drilling records shall not relieve the Contractor of any of his responsibilities for keeping records.

4. DRILLING

4.1 Depth of drilling

Drilling will be done to a maximum required depth at a minimum nominal hole size of 6 inches or as approved by the Engineer; boreholes shall be continued as drill holes when directed by the Engineer.

4.2 Accuracy of alignment of drill holes

Drill holes shall be within 1 degree of the required angle

4.3 Drilling plant

Drilling rigs shall be of the hydraulic feed type capable of using a rotary cutting tool, tipped with diamonds or other hard material and casing shall conform to B.S. 4019; Part I; 1974 or ASTM-2113-84 or an approved equivalent.

4.4 Drilling/ Boring procedure

The method of drilling may be any approved standard and accepted method of straight rotary drilling/wash boring or the combination of two methods by means of which a hole of specified diameter is extended to the desired depth. Rotary cum wash boring method of drilling shall be used in soils or overburden for the purpose of advancing the hole by washing the interval between designated depths at which sampling and testing is to be undertaken.

During drilling the Contractor shall regulate the drilling at such speeds and control, the drilling fluid at such pressures which will ensure the minimum disturbance in the underlying material in which the in situ testing and sampling is to be carried out.

4.5 Drilling Procedure, Core Recovery (Boulders / Rocky Strata)

Drilling in rock/ hard strata shall be for the purpose of recovering cores. Drilling shall be carried out in such a manner and using such sizes of bits, that the maximum of core is recovered. This requires close surveillance of flushing media, drilling pressures, lengths and runs and all other factors relevant to the nature of the material drilled. The drill bit shall be withdrawn and the core removed as often as may be necessary to secure the maximum possible amount of core. In soft or friable formations dry drilling techniques may be required using single tube core barrels with tungsten carbide bits as directed by the Consultant's Representative. Length of Coring Runs (Boulders / Rocky Strata)

4.6 Coring Runs

Coring runs shall be limited to a maximum depth as mentioned in Bidding Data/ Bill of Quantities or as directed by the Consultant's Representative. When less than 80 percent of the core is recovered from a run the length of the following run shall be reduced to 50 per cent of the previous length unless otherwise directed by the Consultant's Representative.

4.7 Casing Advance

In all boreholes, casing shall be advanced in sequence with each run.

4.8 Removal of Cores on Blocking (Boulders / Rocky Strata)

The core shall be removed from the drill hole immediately if blocking of the bit or grinding of the core is apparent, regardless of the length of run which has been made.

4.9 Flushing Media

Clean water shall be the flushing medium in the drill holes unless the Engineer's Representative directs that bentonite mud shall be used.

4.10 Unusual Coring Experiences (Boulders/Rocky Strata)

As the function of drilling includes determination of width, orientation, extent and spacing of fissures, fractures or voids, the Contractor shall exercise particular care in recording water losses, artesian pressures, rod jerks or any other unusual coring experiences which will supplement the core record and further document the nature and extent of fracturing or voids.

4.11 Drilling through Gravels in Rock (Boulders / Rocky Strata)

Where gravels are encountered within the bedrock the Contractor may cross the full depth of the gravel bed by using core drilling. Accurate record of these strata should be kept.

4.12 Stabilizing holes in loose soil

Drilling mud of suitable consistency shall be used to stabilize the walls of bore holes and to prevent caving and disturbance of the materials to be sampled. The drilling mud shall be a mixture of bentonite and water with approved chemical additives if required, to assist in modifying its density and viscosity.

Where drilling mud is not effective, casing of appropriate size and strength may be used subject to the approval of the Engineer. It will be the responsibility of the contractor to use appropriate means to stabilize the walls of the boreholes. The level of drilling mud shall at all time be maintained at the top of the borehole.

It shall be ensured that there is no jetting action of the drilling fluid. The minimum amount of drilling fluid necessary to carry away the cuttings shall be used. During drilling the Contractor shall regulate the pressure of the drilling fluid to ensure minimum disturbance in the underlying material in which the in situ testing and sampling is to be carried out.

5. SAMPLING

5.1 General

The Contractor shall take samples from any hole when ordered to do so by the Engineer. This shall include the provision of all necessary sampling equipment, tubes and containers crates and boxes, as well as handling and transportation to the approved laboratory or store.

5.2 Approval of equipment

No equipment or containers shall be used unless approved by the Engineer.

5.3 Care of samples

The Contractor shall be responsible for the safe keeping of samples of all kinds until they have been handed over to the Engineer or disposed off on the Engineer's instructions as the case may be. Any sample damaged or showing signs of deterioration while in the Contractor's care shall be replaced by the Contractor at no expense to the Engineer as specified by the Engineer. All samples shall be prepared and packed as quickly as possible after removal from the ground to preserve the natural condition of the soil.

5.4 Numbering of samples

The Contractor shall assign a reference number to each soil and water sample taken from holes. The number shall be unique for that hole and shall be in order of depth below ground level.

5.5 Labeling samples

All disturbed and undisturbed soil samples and water samples taken from holes shall be clearly labeled. Each label shall include the following information:-

a) Name of Contract

b) Reference number of the hole

c) Reference number of the sample

d) Date of sampling

e) Brief description of the sample (e.g. stiff blue silty clay)

f) Depth of the top and bottom of the sample below ground level.

g) Number of the sampler tube.

Tubes and crates for undisturbed samples shall be labeled ‘Do not jar or vibrate’ and ‘Haul and transport in a horizontal position’.

5.6 Small disturbed soil samples

In all the holes, small, disturbed samples shall be taken at the top of each stratum, and at intervals as directed by the Engineer. Material from the cutting shoes of open drive undisturbed samples, and from the split spoon sampler used for Standard penetration tests shall also be taken as disturbed samples.

Disturbed samples shall be truly representative of the composition of the in situ soil. When the samples have been taken from the hole, they shall be placed without delay in airtight container of not less than 1 kg capacity. The container shall be labeled in accordance with Clause 5.5

5.7 Large disturbed soil samples

Large truly representative disturbed samples at least weighing 60 kg shall be taken from the testpits from the layer of sands and cohesive soils or as directed by the Engineer. At the same time, small, disturbed samples of the same material shall be taken, in accordance with Clause 5.6.

5.8 Sealing, labeling and dispatch of large disturbed soil samples to the approved laboratory

All large samples shall be sealed into heavy duty plastic bags of at least 500 gauge thicknesses immediately after they are taken. The sealed bag shall then be placed inside another similar plastic bag. Each outer bag shall be labeled in accordance with Clause 5.5 and a second label giving the same information shall be placed inside the outer bag. These samples shall be transported to the approved testing laboratory.

5.9 Field moisture content samples

Field moisture content samples shall be taken with (and separate from) each small disturbed sample or as otherwise directed by the Engineer. The samples shall be placed in airtight containers immediately after sampling. One sample shall be enough to fill the container.

They shall be kept wrapped in damp cloths in boxes and delivered to the laboratory within twenty four hours of sampling or as directed by the Engineer.

5.10 Open drive undisturbed sampling in holes

Contractor shall clean the hole to the prescribed sampling elevation by means of rotary drilling or washing ensuring that the material to be sampled is not disturbed by the drilling and clean out operation. To minimize the compacting effect of casing driving the bottom of the casing shall be kept as high above the soil zone to be sampled as the conditions permit. Above the water table samples shall be obtained from a dry hole. Below the water table, water shall be maintained within the hole at or above groundwater level.

Sampling with the open drive sampler (Shelby tube) will consist of lowering the sampler to the bottom of the hole and forcing the thin walled cylindrical tube into the soil in one continuous push, without rotation, using the hydraulic feed and weight of the drill rig. The sampling tube shall not be hammered into the material being sampled. The length of the undisturbed sample thus shall not be less than 30 cm.

5.11 Withdrawing the sampler

Before withdrawal of an open drive sampler the sampler shall (if practicable) be rotated through one complete revolution to shear the soil horizontally at the bottom of the sampler. The sampler shall then be withdrawn smoothly so as to cause the minimum disturbance to the sample. The total length of the sample shall be measured and recorded and, if any of the soil has fallen out of the bottom of the tube, this fact shall also be recorded.

5.12 Unsuccessful open drive sampling

There shall be no payment for a failure to obtain an open drive undisturbed sample and will be paid if the sample recovered is not less than 5 inch long, or the Engineer is satisfied that the failure was in no way caused by negligence of the Contractor.

5.13 Undisturbed sampling with Pitcher/Denison sampler

When directed by the Engineer the Contractor shall core in drill holes with Pitcher/Denison sampler. The Pitcher/Denison sampler shall be capable of recovering cores with minimum diameter of NX size and a minimum length of 60 cms. Sampling with Pitcher sampler will consist of lowering it to the bottom of the hole and rotation coring in the normal manner. After completion of the drive, the sampler shall be withdrawn from the hole, extreme care being taken to avoid disturbance. The liners containing the core shall be separated from the barrel without jarring the core. The maximum possible length of core shall be obtained through each sampling operation. The core sample shall not be removed from the liner. The soil in the liner at the ends shall be trimmed to a depth of about 2 inches to a smooth flat surface, which shall be painted with warm liquid wax. A wooden filler block previously waxed shall be placed inside the liner tube at each end and covered with melted wax. The soil retained in the inner shoe and that removed from the top of the core shall be used for field identification and moisture content determination when directed by the Engineer.

The samples shall be labeled in accordance with Clause 5.5 and will be stored in the manner prescribed for undisturbed samples in Clause 5.14.

5.14 Sealing, labeling and storing undisturbed samples

After removing the cutting shoe and the adaptor head with the disturbed material which they contain, the visible ends of the sample shall each be trimmed of any wet disturbed soil and then immediately coated with not less than four layers of just molten microcrystalline wax or other similar material approved by the Engineer. A metal foil disc 0.6 inch greater diameter than the tube shall then be added and followed by more molten wax to give a total thickness of not less than 1 inch. Any space remaining in the ends of the sample tube shall be filled with damp sawdust or other material approved by the Engineer and the ends of the sample tube shall be covered with tight fitting plastic caps.

The sample tube shall immediately be labeled in accordance with Clause 5.5. A second label giving the same information shall be placed inside the sample tube at the top end.

The sample tubes shall be protected from adverse effects of the weather and must be stored as per ASTM standard.

5.15 Core Boxes

The Contractor shall provide wooden boxes for preserving cores. The cores boxes with two (2) cm thick partition shall be of sound construction made of two (2) cm thick good quality timber free of rot, knots and other defects. The timber shall be treated with termite resistant chemicals such as Shelldrite or equivalent. The bottoms shall be screwed on and covers shall be hinged and provided with screw plates and screws to keep the cover closed. Partitions shall be arranged for convenient marking and interpretation of cores. Partitions may be placed in the field to accommodate the

size of cores being taken so that continuous core may be available for each drill hole in any one box even if the core size is changed. The core boxes shall become the property of the Consultant/Client when the core has been permanently placed therein.

5.16 Cores

The cores obtained from drill holes shall be carefully removed from the core barrel by means of a hydraulic or pneumatic core extruder and placed on plastic sheeting in core boxes. The plastic sheeting shall then be wrapped over the top of the core and sealed with adhesive tape so as to preserve its moisture. Field moisture samples shall be taken as directed by the Consultant's Representative.

Core shall be placed in the boxes in the correct sequence, with increasing depth from left to right in the box and from the hinged side to the hasp side of the box.

Fractured material which can be reassembled to form clearly defined core shall be reassembled and packed securely. Material which does not conform to the definition of core shall be spread throughout its length and packed securely. Core losses shall be shown by wooden blocks of a square cross section of approximately the same area and of a length equal to that of the core lost; these should be inserted immediately after the core is placed in the core box.

Each core run shall be segregated by labelled wooden blocks 2.5 cm thick and the depth of the bottom of each run shall be marked on the partitions in the core box with paint.

No box shall contain more than three (3) meters of core.

5.17 Marking of Core Boxes

The core boxes shall be marked prominently on the top sides and ends or as directed by the Consultant's Representative using waterproof jet black paint. The markings shall include the name of the Contract, the working area, the drill hole number, box number and the total number of boxes for the drill hole. The same markings shall be painted inside the lid so as to be read when the lid is open, by someone standing at the hasp side of the box.

5.18 Storing and Disposal of Core Boxes

Before the completion of a drill hole the cores from that hole shall be stored neatly at the drill hole locations in such a manner that inspection of the cores can be made easily. The boxes containing the cores shall be stored under cover and protected from the weather, to the satisfaction of the Consultant's Representative. The Drilling Contractor shall transport all boxes containing cores from the site to an approved agency when directed by the Consultant's Representative.

5.19 Core Samples

Lengths of core not less than 25 cm and not more than 50 cm long shall be taken for use as samples for laboratory testing when directed by the Engineer's Representative.

Such samples shall be cut from the core as it is extruded from the core barrel and a spacer bearing the sample number shall be placed in the core box.

5.20 Waxing Core Samples

Immediately they are taken core samples shall be cleared of any loose sludge and coated with microcrystalline wax and cheese cloth or other similar material approved by the Engineer's Representative. The coating shall be built up in layers of both wax and cloth to a total thickness of not less than 25mm in order to seal the samples against loss of moisture by evaporation. The samples shall then be packed with straw or sawdust in wooden boxes and transported the same day to the laboratory. The wooden boxes shall become the property of the Consultant. The samples shall be stored in the manner prescribed for undisturbed samples in Clause 5.14.

5.21 Labelling Core Samples

The top of the core sample shall be clearly marked before it is waxed and on the outside of the wax. Labels in accordance with Clause 4.5 shall be placed inside the wax, outside the wax and on the wooden box.

5.22 Photography of Cores

The Contractor shall take colour photographs (with Digital Camera Device) of the core boxes containing the cores from vertically above so that the markings on the inside of the lid and on the partitions and blocks are legible in the photographs. The plastic wrapping shall be folded back out of sight, and shall be replaced and sealed again with adhesive tape after the photographs have been taken. A Grey Step wedge from the Kodak Colour Separation Guide shall be displayed with the cores and shall be included in each photograph.

The photography shall be taken from a close distance in order to show the core details. If the core has dried out it shall be sprayed lightly or wetted with a damp cloth to accentuate the colour of the core.

Every month and latest when finishing the Field Works, the Drilling Contractor shall furnish the electronic files of all pictures taken on core boxes during the field work.

5.23 Water samples

The Contractor shall take water samples from holes when directed by the Engineer, before the addition of water to the hole unless this is impossible. If necessary the hole shall be bailed out before taking the sample to ensure that any potential contaminant is removed. No fuel or other potential contaminant shall be allowed to enter the hole. The method of sampling shall be to the approval of the Engineer. Samples shall only be stored in approved airtight and scrupulously clean containers, and shall not be less than 1.0 liter in volume. Water samples shall be transported to the approved laboratory.

5.24 Transport of samples

All samples shall be transported to the store at the site the day the sample is collected. Samples in tubes shall be transported with the tubes in a horizontal position. Selected samples shall be transported by the Contractor to the laboratory approved by the Engineer.

Every precaution shall be taken to avoid damage to the undisturbed samples during transportation. Samples including tube samples shall be transported in wooden boxes made from 5/8 inch or heavier timber, and with a capacity of holding six (6) samples. The samples shall be well packed in suitable material to protect the samples against vibration. The Contractor shall not expose sealed and coated samples to direct sunlight or extreme temperatures.

6. FIELD TESTING

6.1 Standard Penetration Test (SPT)

When directed by the Engineer, the Contractor shall carry out Standard Penetration Test (SPT) in any type of material. The penetration resistance 'N' shall be expressed as the number of blows of a 140 lbs hammer dropping freely from height of 30 inches to force the standard split barrel sampler 18 inches into the soil. The penetration resistance 'N' shall be expressed as the number of blows of the hammer required to force the sampler the last 12 inches into the soil.

Equipment to be furnished by the Contractor for carrying out SPT shall include split tube sampler, drive shoe with core catcher, 'A' or 'AW' rods (OD 1.718 inches, ID 1.344 inches) for depth less than 50 ft and 'N' or 'NW'; rods for greater depth, 140 lbs weight donut type hammer, manila rope and free running pulley, guide pipe and driving head supplies, all casing, pumps, power tools for sampling and containers for preserving tools for sampling and containers for preserving samples. The anvil in all respects shall conform to ASTM Designation D 1586-99.

The beveled edge of the drive shoe shall be maintained in good condition and if excessively worn, shall be resharpened to the satisfaction of the Engineer. Damaged or bent drive shoe of the sampler shall not be used; it shall be replaced if damaged in such a manner as to cause projections within the interior surface of the shoe. A core catcher consisting of thin flexible flaps which fold back flush with the inner surface of the sampler during driving shall be fitted above the drive shoe or within the shoe.

Standard penetration tests shall be carried out in the holes as and when directed by the Engineer during the progress of work. If the Engineer or Contractor has reason to believe that the hole has entered a layer which consists predominantly of sand or finer soil, boring shall be stopped after cleaning the bottom of the hole taking utmost care to bail out all the loosened material which could have remained in the hole from the zone above the test level. Then rotary rig shall be installed for drilling 4 inches to 6 inches diameter holes, and smaller diameter casing (4 inch – 6 inch) fitted with a casing bit at the bottom shall be lowered to the bottom of the hole, the hole should then be drilled using mud and tricone bit or any other bit with upward discharging device 8 inch below the bottom of the hole. The smaller dia casing shall then be

advanced to this depth by rotating with wrench. If unable to do so with wrench, rotary rig may be utilized to advance the casing. In no case will the casing be driven by hammering. Sounding of the hole shall then be made and further drilling, if required, shall be performed with tricone bit using mud for flushing to ensure the hole is open to the base of the casing but no deeper. Casing shall remain filled with mud slurry all the time to the top. During the process of boring, washing or cleaning the hole, utmost care shall be exercised to ensure that the material to be tested and sampled has not been disturbed by these operations. The casing shall not be in advance of the bottom of the hole where the test is to be conducted.

The split barrel sampler attached to drill rod shall then be lowered to the bottom of the hole. The drive weight shall then be allowed to fall on the anvil freely until the sampler has penetrated 6 inches into the soil (the seating drive). The penetration test shall then be started and the number of blows for each 3 inches penetration shall be recorded until 18 inches penetration is achieved.

In case, the driving of the shoe cannot be achieved even by performing one of the following efforts:

- A total of 50 blows have been applied during any one of the three 6 inches increments.
- A total of 100 blows have been applied (including the seating drive) or
- There is no observed advance of the sampler during the application of 10 successive blows of the hammer.

Then, the test shall be considered as presenting Refusal to Penetration and shall be terminated even if the required Penetration of the sampler has not been obtained. In such cases the number of blows and the penetration attained shall be recorded. Immediately after each test, the sampler shall be carefully disassembled and any soil sample collected classified. The most representative portion of the soil sample from the bottom of the 12 inches drive shall be placed in an airtight container. This soil sample shall be made for the collection and preservation of such disturbed samples. The cost of such sampling shall be deemed to be included in the unit rate for performance of standard penetration test. After performing the first test in this way the hole shall be drilled with tricone bit using mud, and sounding shall be taken to ensure that the hole is clean to the bottom of the previous test. Then a second SPT shall be performed in the same manner as described above or undisturbed samples shall be collected as directed by the Engineer.

During the performance of SPT, including the seating drive, extreme care must be exercised in obtaining an accurate 30 inches free fall of the hammer. The rod above the hole collar should be held in vertical position to prevent energy loss due to rod whip or buckling uniformity must be obtained in all SPTs to be done. The rate of application of hammer blows should be between 10 and 20 blows/minute.

In case of gravelly soil the SPT shoe should be replaced by the solid cone with apex at 60^0 in accordance with BS 5930. (1981)

The test data obtained shall be recorded in the field and shall include the following:

i. Test number and depth
ii. Description of soil
iii. Thickness of layer
iv. Depth of water level; time at which test was made.
v. Number of blows for each 3 inch penetration and total length of penetration.
vi. Penetration resistance 'N' value.

One copy of the field data for each test shall be supplied to the Engineer within 24 hours of completing the test.

6.2 Field Permeability Tests

When directed by the Consultant, the Drilling Contractor shall carryout permeability tests in boreholes. These tests would be carried out by Constant Head / Falling Head method under flush bottom conditions or by lifting the casing (Column method), or as approved by Consultant.

When directed by the Consultant's Representative the Drilling Contractor shall carry out variable head (rising or falling) or constant head permeability tests to determine the in-situ permeability of the soils. The Contractor shall place a quantity of approved gravel or sand filter material in the hole sufficient to fill the hole to 1 m above the bottom of the hole and to raise the casing of the borehole a small distance prior to starting the test, if directed by the Consultant's Representative. The water in the hole shall then be allowed to reach a steady level, which shall be recorded. Only clear water shall be used in the hole for the test. The depth of the hole shall be sounded immediately before and immediately after each field permeability test.

In the falling head permeability tests, the casing is filled with water which is then allowed to seep into the soil. The rate of drop of the water level in the casing is observed by measuring the depth of the water surface below the top of the casing at 1, 2 and 5 minutes after the start of the test and at 5-minute intervals thereafter. These observations are made until the rate of drop becomes negligible or until sufficient readings have been obtained to satisfactorily determine the permeability, in the opinion of the Consultant's Representative.

The rising head permeability test consists of bailing the water out of the casing and observing the rate of rise of the water level in the casing at intervals until the rise in water level becomes negligible. The rate of rise is observed by measuring the depth of the water surface below the top of the casing at 1, 2, and 5 minutes after the start of the test and at 5 minute intervals thereafter. These observations are made until the rate of rise becomes negligible or until sufficient readings have been obtained to satisfactorily determine the permeability.
In the constant head permeability test water is added to the casing at a rate sufficient to maintain a constant water level at or near the top of the casing for a period of not less than 10 minutes. The water may be added by pouring from calibrated containers or by pumping through a water meter. The data recorded should consist of the amount of water added to the casing at 1, 2 and 5 minutes after the start of the test and at 5 minute intervals thereafter until an adequate determination of the permeability has been made, in the opinion of the Consultant's Representative.

The following data must be recorded for all field permeability tests in addition to the readings specified.

Steady, ground water level before test.
Internal diameter of casing.
Height of casing above ground level.
Depths of other casing below ground level.
Depth of smallest casing below ground level.
Depth of hole below ground level.
Diameter of hole below casing.

At the start of the test, date and time must be recorded.

Two copies of the field data for each test recorded on forms (approved by the Consultant's Representative) shall be supplied to the Consultant's Representative immediately after performance of test and two preliminary copies of the results of each test shall be submitted to the Consultant on the next working day.

6.3 Electrical Resistivity Survey

Electrical Resistivity Survey will be carried out along the pipeline route for the determination of soil corrosion potential.

6.4 Seismic Refraction Survey

Seismic Refraction Survey will be done at the AGI locations and major crossings where rock is expected at shallow depth.

7. EXCAVATION OF TEST PITS

7.1 Areas to be investigated

The limits of the project site and the approximate locations of the tespits shall be indicated on Drawing, but the Engineer may change the locations within the limits of the area to be investigated during the progress of the work. The Engineer will specify from time to time during the contract period the exact location and reference number of all test pits, but locating the test pits accurately in the field shall be the Contractor's responsibility.

7.2 Excavation

7.2.1 Excavation method

The Contractor shall perform excavation in test pits to final dimensions, lines and depths as specified or approved by the Engineer. The Contractor will be free to choose any method of excavation with prior approval of the Engineer. The Contractor shall be entirely responsible for the success of the method of excavation used regardless of approval by the Engineer. The Contractor shall carry out his excavation operations in a manner so as to cause least disturbance to the in situ material outside the lines of excavation

7.2.2 Excavation extent

The testpits shall be up to a maximum of 3.0 m depth or as specified in BOQ at least 1.0 m x 1.0 m throughout their depth or as directed by the engineer. The Contractor shall excavate testpit so as not to have any protrusions inside the clear section. Excess excavation performed by the Contractor for any purpose or reason, except that ordered in writing by the Engineer, shall be at the expense of the Contractor. The Contractor shall keep the walls and floor of the test pits accessible and clean for inspection by the Engineer. The Contractor will prepare a detailed testpit log of the strata encountered as directed by the Engineer.

7.2.3 Removal and Disposal of Excavated Materials

The Contractor shall remove all excavated materials and any caved in debris from the testpits and shall be responsible for disposal of such excavated material away from top of the test pits as directed by the Engineer.

7.3 Supports of test pits excavation

The Contractor shall properly support the testpit excavation as and when instructed by the Engineer in writing. The Contractor alone shall be responsible for the adequacy of the supports regardless of the approval by the Engineer. Timber supports shall be used and left in place after completion of test pits for sampling and logging. The Contractor shall be free to use his own system of timber supports with the approval of Engineer. However nothing contained in this clause shall relieve the contractor of his responsibilities in respect of adequacy of supports of the excavations. If necessary, the Engineer shall direct the Contractor to install additional supports or to abandon an unsafe pit without any payment to the Contractor. The support system shall be removed before backfilling of Test pits.

7.4 Rain and surface water

Surface water shall be prevented from entering the test pit. For this purpose suitable earth dykes or interceptor ditches shall be constructed by the Contractor around the testpit at suitable locations with the approval of the Engineer. The Contractor shall also remove any accumulated water from within the pits.

7.5 Hoisting arrangements

7.5.1 Hoisting equipment

The Contractor shall provide, install, operate and maintain hoisting equipment wherever required as approved by the Engineer and operate such equipment for removal of excavated material and all other related purposes.

7.5.2 Mucking buckets

The Contractor shall provide, install, maintain and operate mucking buckets. The buckets shall be of suitable size and sound construction as approved by the Engineer.

In addition, the Contractor will provide such other equipment, as he may deem necessary for efficient handling and disposal of excavated material.

7.6 Blasting in test pit

Blasting shall not be allowed for breaking up material encountered in a test pit except with the written permission of the Engineer. Such permission shall only be given if a boulder with diameter larger than half the width of the pit is encountered.

7.7 Supplementary test pit

Test pits that are abandoned due to fault of the Contractor shall be supplemented by other test pits adjacent to the original location. The exact location of such supplementary test pits shall be specified by the Engineer in the field.

No payment will be made for the portion of supplementary test pit above the depths paid for the unacceptable test pit.

7.8 Daily field records

Each day during the work on the Site, the Contractor shall hand over to the Engineer the original and a legible copy of the records of the previous day's work containing the following information in respect of each test pit where work was in progress.

a. Name of Contract
b. Number, and size of the testpit
c. Date and hours worked on the site
d. Brief description of the weather
e. Total depth of testpit at the beginning and end of each shift.
f. Reference number, depths and other details of all small and large disturbed samples.
g. Description of material encountered.
h. Details of backfilling if any
i. Details of reasons of delays
j. Any other relevant information and details of any other operation.

7.9 Backfilling testpits

When instructed by the Engineer, the Contractor shall backfill the Test pits. The materials for backfilling shall come from material excavated and the procedures shall be approved by the Engineer.

7.10 Logging, collection of samples and in situ testing

The Engineer or his staff shall inspect strata exposed by the excavation to prepare testpit logs on approved forms and direct the contractor to collect disturbed and undisturbed samples during the progress of excavation. Whenever the Engineer or his staff enters a test pit the Contractor shall temporarily suspend his operations inside the test pit and shall provide to Engineer or his staff all facilities including labor and access through ladders into and out of the pit.

7.11 Contractor's responsibility for records

The presence of the Engineer or any of his staff and their keeping separate test pit excavation records shall not relieve the Contractor of any of his responsibilities for keeping records.

7.12 Field testing and sampling in test pits

7.12.1 Field density

Field density tests shall generally be carried out in the test pits at depths below the natural ground surface as specified by the Engineer.

Field density test shall be carried out in accordance with ASTM D 2937 (Density of soil in place by Drive Cylinder Method) or D 1556 (Density of soil in place by the Sand Cone Method) appropriate to the site conditions. The Engineer will examine and decide which method of field density test is most suitable for the site. Moisture content test shall be carried out by laboratory oven method or speedy moisture tester or as directed by the Engineer.

7.12.2 Sampling

a) Disturbed samples

Disturbed samples shall be collected for carrying out classification test at the depth and location to be specified by the Engineer at the site.

b) Undisturbed block samples

In cohesive stratum, hand cut undisturbed block samples 12 inches cube shall be collected at the locations and depths specified by the Engineer at the time of excavation. Samples shall be collected in accordance with the procedures and provision given in Earth Manual of U.S.B.R.

c) Composite samples

Composite samples shall generally be collected in those horizons where field density tests are carried out. The quantity of each sample shall be enough to allow carrying out classification and laboratory compaction test.

8. LABORATORY TESTING

8.1 Approved Laboratory

The soil / water samples shall be tested at a local approved laboratory. The Engineer shall have access to the laboratories to supervise and check the laboratory testing of the samples. The testing shall be carried out in accordance with ASTM, BS or AASHTO Standards or as directed by the Engineer.

8.2 Testing Program

The Contractor shall arrange to carry out the laboratory tests on the specified samples of the subsoil materials and water. The Engineer shall issue particular instructions for any tests, if required. The samples to be tested and the tests to be carried out for each sample shall be specified by the Engineer.

8.3 Type of Tests

The testing in the laboratory shall comprise, but not limited to, the following tests:

1. Grain size Analysis
2. Hydrometer Analysis
3. Atterberg Limits (LL,PL)
4. Specific Gravity
5. Unconfined Compression test
6. Unconsolidated undrained direct shear test on soil
7. Natural Moisture Content and Bulk Density
8. Consolidation with swell potential determination
9. 3 Point Soaked CBR
10. Modified AASHTO Compaction
11. Sulphate content of soil/water
12. Chloride content of soil / water
13. pH value of water
14. Organic matter content of soil
15. Total Dissolved Salts in water

LIST OF APPROVED LABORATORIES

Employer's approved laboratories have been listed hereunder:

1. SOILCON Geotechnical Testing Laboratories, 18- Km, Multan Road Lahore.
(Tel # 042-7510942, Fax # 042-7510944)

2. Central Materials Testing Laboratories (CMTL) WAPDA, Near Muhammad Pura Village P.O Thokar Niaz Baig, Lahore.
(Tel # 042-5300922, Fax # 042-5302921)

3. Soil Mechanics Laboratory Civil Engineering Department, UET, Lahore.
(Tel # 042-9029273, Fax # 042-9029202)

4. Firm DECON International (Pvt.) Ltd., 17 kilometer Shahdara, Kalakhatai/Narang Mandi Road Opposite Police Post Laban wala Tehsil Ferozewala District Sheikhupura.
(Tel # 0347-4625111)

5. Berkeley Associate, 316-D, OPF Housing Colony, Raiwind Road, Lahore.
(Tel # 042-8452273, Fax # 042-5323316)

6. National University of Science and Technology, Islamabad.
NUST Institute of Civil Engineering (NICE), NUST H-12 Sector, Islamabad
(Tel # 051-90854629 / 051-90854583)

If the Contractor intends to acquire the services of any testing laboratory other than the laboratories mentioned above, he shall obtain approval of the Engineer and will be responsible for arranging to provide all relevant data required by the Engineer for the approval of the Engineer.

9. REPORTS AND RECORDS

9.1. Introduction

The Contractor shall prepare and submit to the Engineer, one copy of a report/data on all work at site and such other details as required by the Engineer appropriate to the work performed.

9.2. Daily Report

The Contractor shall prepare a Daily Report signed by the Contractor's agent or representative on site for each exploratory hole/testpits, which shall be submitted to the Engineer within 24 hours of the completion of the exploration to which they refer and contain the following information where relevant.

i General

(a) Job name, location and coordinates.

(b) Rig foreman's name.

(c) Exploratory hole reference number and level.

(d) Visitors to rig site (including Contractor's head office staff).

(e) Name of Supervisory Staff.

ii Rotary Borings

(a) Rate of penetration

(b) Diameters and depths of all casings used

(c) Any addition of water to the boring

(d) Method of penetration and flushing system

(e) Type of bit used

iii Excavation of testpits

(a) Elevation of top of testpit

(b) Records of groundwater, if any

(c) Depth at the end of each working day or shift

(d) Depth to each change of stratum

(e) Description of subsoil strata encountered.

(f) Details of obstructions and time spent in and method of overcoming them.

(g) Details of backfill

(h) Depth of bottom of tespit

9.3. Submission of complete field and laboratory data

The results of each borehole, testpit and field tests carried out shall be communicated to the Engineer as follows:

i) Oral reports as the work proceeds.
ii) One set of complete data of the work in the form of a bound document, which shall contain but not limited to:

(a) A site plan showing the position of the boreholes and testpits and giving their map reference.
(b) The borehole and testpits logs.
(c) Complete results of field tests.
(d) Complete results of Laboratory tests.
(e) Comments on any point, which the Engineer has put to the contractor for inquiry and investigation during the works..

9.4 Payment for reports

No separate payment will be made for the reports the cost of which shall be deemed to be included in the other items of work.

9.5 Detailed Geotechnical Investigations Report

The Contractor shall be responsible for preparation of detailed geotechnical investigations report if required in Bid Invitation Letter and Bill of Quantities. The report will include but not limited to the following information:

a) Brief detail of the project including location plan and geotechnical investigation plan
b) Information regarding geology, seismicity, topography & subsurface lithology of the area
c) Details of field and laboratory works
d) Necessary geotechnical recommendations for design of foundation and road works

10. MEASUREMENT AND PAYMENT

BOQ Item A-1 Mobilization and demobilization

a) Measurement

No quantity measurement will be made of the work under this item and payment shall be based on the completion of work as specified herein.

b) Payment

The payment shall constitute full compensation for all costs for mobilization and demobilization. The contract rates shall be deemed to include all costs for providing, transporting, operating and maintaining all the equipment and plant necessary for site investigation work along with providing water, power, providing all insurance covers, providing any other expense not covered in the item rates of the BOQ and shifting and setting up at each borehole location.

BOQ Item A2-A3 Drilling of bore hole:

a) Measurement

The actual quantity shall consist of the full depth of acceptable vertical drill hole as measured along the line of the hole.

b) Payment

All the necessary operations done to accomplish drilling as specified shall be deemed to be part of this item. The casing of the drill holes or boreholes, taking and recording of water levels in holes, supply of daily field record and drill / borehole logs and all associated costs shall be deemed to be included in the contract rate. No separate payment shall be made for backfilling of holes and drilling of angle holes.

BOQ Item A4 Carrying out standard penetration tests (SPT) in drill / boreholes

a) Measurement

The measurement for standard penetration tests shall be made as number of standard penetration tests actually performed on the instructions of the Engineer in a drill hole or a bore hole.

b) Payment

Payment shall be made as a unit for each test. The contract rate shall be deemed to include all labour and equipment required to perform the tests including standing time of labour and plant while the test is being set up and dismantled or in progress and the preparation and supply to the Engineer of any preliminary copies of test data and results as well as all the costs for providing jars, labeling, preservation and transportation of samples to the laboratory.

BOQ Item A5 Collection of undisturbed Soil samples from boreholes using Shelby tube/Pitcher/Denison sampler etc.

a) Measurement

Measurement shall be made as number of acceptable undisturbed open drive tube samples Pitcher/Denison samples separately and actually recovered on the instructions of the Engineer.

b) Payment

Payment shall be made as a unit for each undisturbed sample successfully recovered. The contract rate for these items shall be deemed to include the cost of any incidental delay of standing time of labour and plant, for the cost of taking, sealing, labeling, transporting samples and the cost of supply of all approved tubes, containers, crates and boxes which shall become the property of the Engineer after delivery to the approved laboratory.

BOQ Item A6 &7 Excavation of testpits for foundation and construction materials

a) Measurement

Measurement under this item will be computed by actual measurement methods and will be made of number of linear meters actually excavated below ground surface (according to a specified size and depth). Measurement will be correct to a centimeter. This also includes backfilling after logging.

b) Payment

Payment shall be made at the Contract unit price for this item and shall constitute full compensation for the tools, plant labour etc. required to excavate the test pit and later

on backfill the testpit

BOQ Item A8 Performance of field density test in test pits

a) Measurement

Measurement for field density tests shall be made as number of field density tests actually performed on the instructions of the Engineer. Determination of moisture content shall be considered inclusive in the field density test

b) Payment

Payment shall be made as a unit for each test. The contract rate shall be deemed to be include all labour and equipment required to perform the tests including standing time of labour and plant while the test is being performed and preparation and supply to the Engineer preliminary copies of the test data as well as cost of containers for NMC and transportation of samples to the laboratory and performance of NMC in the laboratory.

BOQ Item A9 Extraction of hand-cut block sample from test pits

a) Measurement

Measurement shall be made as number of block samples actually taken on the instructions of the Engineer.

b) Payment

Payment shall be made as a unit for each block sample. All the costs incurred on providing equipment material and labour etc. for extraction, labeling, storage and transportation as well as the cost of containers and boxes shall be deemed to be included in the contract value.

BOQ Item A10 Collection of composite bulk sample from test pits

c) Measurement

Measurement shall be made as number of bulk samples actually taken on the instructions of the Engineer.

d) Payment

Payment shall be made as a unit for each bulk sample. All the costs incurred on providing equipment material and labour etc. for collection labeling, storage and transportation as well as the cost of bags containers and boxes shall be deemed to be included in the contract value.

BOQ Item A11 Collection and preservation of groundwater samples from boreholes/Testpits

a) Measurement

Measurement shall be made as number of water samples actually taken on the instructions of the Engineer.

b) Payment

Payment shall be made as a unit for each water sample. All costs incurred for providing equipment, material, labour and bailing out of the hole, if necessary and taking sealing, labeling, transporting the water samples as well as the cost of the containers shall be deemed to be included in the contract rate for water sampling.

BOQ Item B1-B13 Laboratory testing

a) Measurement

Measurement under the item "Laboratory Testing" shall be made as per actual number of laboratory tests performed according to ASTM, AASHTO or the equivalent British Standards, or as directed by the Engineer.

b) Payment

Payment shall be made for number of laboratory test actually performed in the laboratories approved by the Engineer according to the price bid by the Contractor in the Bill of Quantities as a lump sum for each test. The lump sum shall be deemed to include complete laboratory testing for the specified test according to ASTM, AASHTO or British Standards and presentation of reports in standard form as directed by the Engineer.

BOQ Item C Detailed Geotechnical Investigations Report

a) Measurement

Measured under the item "Detailed Geotechnical Investigations Report" shall be made as per requirements mentioned in Clause 9.5.

b) Payment

Payment shall be made as per bid submitted by the Contractor subjected that the work is carried out to the entire satisfaction of the Engineer/Employer.

DRAWINGS