



"SAY NO TO CORRUPTION"

Director Procurement

Ref: No. DP/193021/8537/1119
January 30, 2026**Notice Inviting Tenders
(EPADS)**

NEDUET invites Sealed Bids on Single Stage One Envelope procedure from Firms having Registration with Income Tax, Sales Tax and Sindh Revenue Board (whichever is applicable) to carry out following.

S#	Tender / Number	Tender Schedule – Date and Time				Estimated Cost (Rs in Million)	Time of Completion	Tender Fee (Rs)			
		Issue / Sale		Submission	Opening						
		From	To								
1.	Construction of Access Road and Walkways to Girls Hostel at NEDUET. Tender# PC/ NED /GH/Road /8537/2026	03.02.2026	18.02.2026	19.02.2026 10:00 A.M.	19.02.2026 10:30 A.M.	53.524	Three Months	5,000/-			

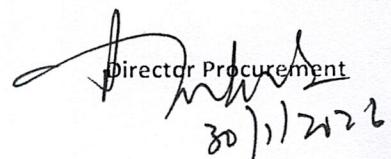
Eligibility criteria:

- Valid Registration with Pakistan Engineering Council in relevant category C-5 & above having specialized code CE-01(i).
- Registered with Sindh Revenue Board and FBR.
- Financial Statement (Summary) and Income Tax Return for the Last 3 years.
- List of similar assignment along with cost undertaken over past 5 years and performing certificate issuing by the procuring agencies.
- Affidavit on (non-judicial stamp paper) of no litigation history, non-blacklisting, never indulge in any corrupt, fraudulent and collusive practices, also undertaking that the information and documents provided with are correct. The date of issuance of sad stamp paper and bidder signature on it should be later then the publication of this NIT.
- Contractors working with NED University must submit a certificate from Project In charge that the work progress and quality of work executed are satisfactory.

Terms and Conditions:

- Under the following conditions, Bid can be rejected:
 - Incomplete, Conditional and Telegraphic Bids.
 - Bids not accompanied by Bid Security of required amount & form.
 - Bids received after Specified Date and Time.
 - Black Listed Firms Companies.
 - Bidders are advised that before filling the Bidding Document all papers of Bidding Documents should carefully be rechecked. If any page(s) / Paper(s) of Bidding Documents are missing, that can be downloaded from the Official website of the University and SPPRA, and also can be obtained from the Office of the DDP in Procurement Cell, NEDUET, Karachi. Bid(s) with incomplete Bidding Document will be rejected.
- Bid validity Period: - (90) days from the date of opening of tender.
- Bid Security: Tender Fee of Rs 5,000/- and 2% of bid cost in the form of Deposit at Call or Pay Order or Demand Draft or a Bank Guarantee issued by a scheduled bank in Pakistan or from a foreign bank duly counter guaranteed by scheduled bank in Pakistan in favor of Director Finance, NEDUET, Karachi.

Procuring Agency reserves the right to reject all or any bids subject to the relevant provisions of Sindh Public Procurement Rules 2010 (Amended up to date). Bidding documents can be obtained and shall be submitted through EPADS as per above schedule. Bidders are requested to give their Best and Final Price as "No Negotiations" is permitted. Bidding Documents containing detailed terms and conditions are available at Websites <https://www.neduet.edu.pk> and <https://www.portalsindh.eprocure.gov.pk>. In case of public holiday or any holiday or non-working day due to Force Majeure, the next official working day shall be deemed to be date for issuance, submission and opening of tenders. NEDUET shall not be responsible for any cost or expenses incurred by bidders.



Director Procurement
30/1/2022

NED UNIVERSITY OF ENGINEERING AND
TECHNOLOGY, KARACHI



TENDER DOCUMENT
FOR
CONSTRUCTION OF ACCESS ROAD AND
WALKWAYS TO GIRLS HOSTEL AT
NED UNIVERSITY

VOLUME - 1

CONDITIONS OF CONTRACT

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FOR
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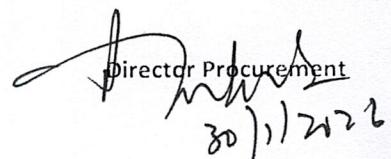
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Director Procurement
30/1/2022

**INSTRUCTIONS
TO BIDDERS
&
BIDDING DATA**

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INSTRUCTIONS TO BIDDERS

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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

Funds are available under Sindh Government approved Development Project

IB.2 Eligible Bidders

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

- (i) Valid Registration with Pakistan Engineering Council (PEC) in category C-5 or above and Specialization code CE-01 (i).
- (ii) Registered with Sindh Revenue Board and FBR.
- (iii) Financial Statement (Summary) and Income Tax Return for the Last 3 years.
- (iv) List of similar assignment along with cost undertaken over past 5 years and performing certificate issuing by the procuring agencies.
- (v) Affidavit that firm has not been black listed and is not involved in any litigation by any Government, Semi Government or Autonomous bodies on Rs. 100 non-judicial stamp paper.
- (vi) Contractors working with NED University must submit a certificate from Project In charge that the work progress and quality of work executed are satisfactory.

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 (Schedule A to Bid) indicating the unit rates and prices of the Works to be performed under the Contract. Prices in the Schedule of Prices 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 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 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 satisfactorily perform the Contract in accordance with the provisions of Clause IB.18.
- 19.2 Notwithstanding 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

(This section should be filled in by the Engineer/Employer before issuance of the Bidding Documents. The following specific data for the Works to be tendered shall complement, amend, or supplement the provisions in the Instructions to Bidders. Wherever there is a conflict, the provisions herein shall prevail over those in the Instructions to Bidders.)

Instructions to Bidders

Clause Reference

1.1 Name of Employer

NED University of Engineering and Technology, Karachi.

Brief Description of Works

Construction of Access Road and Walkways to Girls Hostel at NED University of Engineering & Technology, Karachi.

5.1 (a) Employer's address:

NED University of Engineering and Technology, Karachi
University Road, Karachi-75270
Tel# 021- 99261261-68 (Ext: 2291)
Email: dp@neduet.edu.pk

(b) Engineer's address:

Engr. Dr. Ashar Ahmed.
Tel: (92) 21 99261261 Ext: 2451, Email: aahmed@cloud.neduet.edu.pk

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 as follows

- (i) Valid Registration with Pakistan Engineering Council (PEC) in category C-5 or above and Specialization code CE-01 (i)
- (ii) Registered with Sindh Revenue Board and FBR.
- (iii) Financial Statement (Summary) and Income Tax Return for the Last 3 years.
- (iv) Documentary Evidence of Similar Works executed and works in Progress.

- (v) Affidavit that firm has not been black listed by any Government, Semi Government or Autonomous bodies on Rs. 100 non-judicial stamp paper.
- (vi) Contractors working with NED University must submit a certificate from Project In charge that the work progress and quality of work executed are satisfactory

12.1 (a) **Construction of Access Road and Walkways to Girls Hostel at NED University of Engineering and Technology, Main Campus, Karachi.** The works involves Construction of Road and Walkways at NED University of Engineering and Technology, Main Campus, Karachi, in accordance with the Design, Drawings, Technical Specifications, Bill of Quantities and instructions of the Client / Consultant with special emphasis on Quantity and Quality control ethics.

(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**

Minimum 2% of Bid Price in the form of Pay Order / Bank Guarantee

14.1 **Period of Bid Validity**

Bid shall remain valid for the 90 days after the Date of Bid Opening

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

One original plus 01 copy.

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

The Director Procurement (through EPADS)
NED UET, Admin Block, Karachi.
Phone (92 21) 9926-1261-8 (Ext : 2291) Fax: 9926-1255

15.1 **Deadline for Submission of Bids**

As notified in “Invitation to Bids”

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

As notified in “Invitation to Bids”

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.

16.9 Price Adjustment:

- (iii) Price Adjustment for Deviations in Terms of Payment

If a bid deviates from the terms of payment/payment conditions as specified in the Conditions of Contract and if such deviation is considered acceptable to the Employer, mark-up earned for any earlier payments involved in the terms outlined in the Bid as compared to those stipulated in the Conditions of Contract shall be calculated at the mark-up rate 0% per annum and shall be added to the Corrected Total Bid Price for comparison purposes only.

FORM OF BID AND SCHEDULES TO BID

FORM OF BID

(LETTER OF OFFER)

Bid Reference No. **Construction of Access Road and Walkways to Girls Hostel at NED University of Engineering and Technology, Karachi.**

To:

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

<u>Sr. No.</u>		<u>Page No.</u>
1.	Preamble to Schedule of Prices	26
2.	Schedule of Prices	29
	*(a) Summary of Bid Prices	
	* (b) Detailed Schedule of Prices	

* [To be prepared by the Engineer/Employer]

PREAMBLE TO SCHEDULE OF PRICES

1. General

- 1.1 The Schedule of Prices shall be read in conjunction with the Conditions of Contract, Contract Data together with the Specifications and Drawings, if any.
- 1.2 The Contract shall be for the whole of the Works as described in these Bidding Documents. Bids must be for the complete scope of works.

2. Description

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

3. Units & Abbreviations

- 3.1 Units of measurement, symbols and abbreviations expressed in the Bidding Documents shall comply with the Systeme Internationale d' Unites (SI Units).
FPS/SI SYSTEM

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.

SCHEDULE - A TO BID

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.

(Employer may modify as appropriate)

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

5. Bid Prices

5.1 Break-up of Bid Prices

The various elements of Bid Prices shall be quoted as detailed by the Employer in the format of Schedule of Prices.

The bidder shall recognize such elements of the costs which he expects to incur the performance of the Works and shall include all such costs in the rates and amounts entered in the Schedule of Prices.

5.2 Total Bid Price

The total of bid prices in the Schedule of Prices shall be entered in the Summary of Bid Prices.

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 utilise such sums.

SCHEDULE - A TO BID**SCHEDULE OF PRICES – SUMMARY OF BID PRICES**

Bill No.	Description	Total Amount (Rs)
1.		
	Total Bid Price (The amount to be entered in Paragraph 1 of the Form of Bid) (In words).	

SCHEDULE - A TO BID**SCHEDULE OF PRICES**

Item No.	Description	Quantity	Unit Rate(Rs)	Total Amount (Rs)
1.				
Total (to be carried to Summary of Bid Price)				

SCHEDULE - B TO BID

***SPECIFIC WORKS DATA**

(To be prepared and incorporated by the Employer)

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

SCHEDULE – C TO BID

WORKS TO BE PERFORMED BY SUBCONTRACTORS

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

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

Note:

1. No change of Sub-Contractors shall be made by the bidder without prior approval of the Employer.
2. The truthfulness and accuracy of the statement as to the experience of Sub-Contractors is guaranteed by the bidder. The Employer's judgment shall be final as to the evaluation of the experience of Sub-Contractors submitted by the bidder.
3. Statement of similar works shall include description, location & value of works, year completed and name & address of the clients.

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 including the activities like designing, schedule of submittal of drawings, ordering and procurement of materials, manufacturing, delivering, construction of civil works, erection, testing and commissioning of Works to be supplied under the Contract.

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 times 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:

Signature:

[Seal]

Name of Seller/Supplier:

Signature:

[Seal]

CONDITIONS OF CONTRACT

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CONDITIONS OF CONTRACT

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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 Authorised 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 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 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 Maintenance 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, which ever 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 demobilise 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 hereabove, 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

(Note: Except where otherwise indicated, all Contract Data should be filled in by the Employer prior to issuance of the Bidding Documents.)

Sub-Clauses of Conditions of Contract

1.1.3 **Employer's Drawings, if any**
Drawings are provided in contract document (Volume-3)

1.1.4 **The Employer** means
"NED University of Engineering and Technology, Main University Road, Karachi."

1.1.5 **The Contractor** means
"Contractor" means the person whose tender has been accepted by the Employer and the legal successors in title to such person, but not (except with the consent of the Employer) any assignee of such person.

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

1.1.9 **Time for Completion** Three (03) Months

1.1.20 **Engineer**
"Engineer" means the person appointed by the Employer to act as Engineer for the purposes of the Contract and named as such in Part II of these Conditions.

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

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

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

3.1 **Authorised person :Project Coordinator / Civil Engineer**

3.2 **Name and address of Engineer's/Employer's representative**
Engr. Dr. Ashar Ahmed
NED University
Tel: (92) 21 99261261-8 (Ext: 2451) Email: aahmed@cloud.neduet.edu.pk

4.4 **Performance Security:**
Amount: 05 % of Contract Price stated in the Letter of Acceptance in the form of Pay Order / Bank Guarantee issued by Scheduled Bank of Pakistan

Validity: The performance security shall be valid until the Contractor has executed and completed the Works and remedied any defects therein in accordance with the Contract. No claim shall be made against such security after the issue of the Defects Liability Certificate in accordance with **Sub-Clause 62.1** and such security shall be returned to the Contractor within 14 days of the issue of the said Defects Liability Certificate
(Form: As provided under Standard Forms* of these Documents)

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

7.2 **Programme:**
Time for submission: Within fourteen (14) days* of the Commencement Date.
Form of programme: (Bar Chart/CPM/PERT)

7.4 Amount payable due to failure to complete shall be 0.10 % per day up to a maximum of (10%) * of sum stated in the Letter of Acceptance

9.1 **Period for remedying defects**
90 days from the effective date of Taking Over Certificate.

10.2 (e) **Variation procedure:**
Day work rates____--_____

(details)

11.1 *(a) **Terms of Payments**
Payment of Contract Price shall be made in the following manners:
i) Mobilization advance as per clause no. 60.12,
ii) Minimum amount of interim payment certificate shall be Rs. 10.00 million and in accordance with clause 60.10
iii) Half of Five percent (5%) retention money shall be paid on the date of issuance of Certificate of Completion as per Clause 60.3 of Conditions of Contract, and

11.2 (b) **Percentage of value of Materials:**
Materials as per clause no. 60.11

11.3 **Percentage of retention:** five (5%)

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

14.1 **Insurances:**

Type of cover

The Works

Amount of cover

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

Type of cover

Contractor's Equipment:

Amount of cover

Full replacement cost

* (Employer to amend as appropriate)

Type of cover

Third Party-injury to persons and damage to property as per clause no. 23.2, and minimum Rs. 500,000/- per occurrence with number of occurrences unlimited.

14.2 Amount to be recovered

Premium plus _____ percent (____%).

15.3 Arbitration

Place of Arbitration: Karachi, Pakistan.

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. _____

1. Signature _____

2. Name _____

Corporate Secretary (Seal)

3. Title _____

2. _____

(Name, Title & Address)

Corporate Guarantor (Seal)

**FORM OF PERFORMANCE 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 (Contractor) with
address: _____

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

Letter of Acceptance No. _____ Dated _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bidding Documents and above said Letter of Acceptance (hereinafter called the Documents) and at the request of the said Principal we, the Guarantor above named, are held and firmly bound unto the _____ (hereinafter called the Employer) in the penal sum of the amount stated above, for the payment of which sum well and truly to be made to the said Employer, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

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

(Name of Contract) for the _____

(Name of Project).

NOW THEREFORE, if the Principal (Contractor) shall well and truly perform and fulfill all the undertakings, covenants, terms and conditions of the said Documents during the original terms of the said Documents and any extensions thereof that may be granted by the Employer, with or without notice to the Guarantor, which notice is, hereby, waived and shall also well and truly perform and fulfill all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of the said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 9, Remedying Defects, of Conditions of Contract are fulfilled.

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

We, _____ (the Guarantor), waiving all objections and defences under the Contract, do hereby irrevocably and independently guarantee to pay to the Employer without delay upon the Employer's first written demand without cavil or arguments and without requiring the Employer to prove or to show grounds or reasons for such demand any sum or sums up to the amount stated above, against the Employer's written declaration that the Principal has refused or failed to perform the obligations under the Contract, for which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

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

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

Witness:

1. _____

Guarantor (Bank)

1. Signature _____

2. Name _____

3. Title _____

2. _____

(Name, Title & Address)

Corporate Guarantor (Seal)

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of _____ 200 _____ 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

(Seal)

Signature of the Employer

(Seal)

Signed, Sealed and Delivered in the presence of:

Witness:

(Name, Title and Address)

Witness:

(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.

Guarantor (Scheduled Bank)

Witness:

1. _____

1. Signature _____

Corporate Secretary (Seal)

2. Name _____

2. _____

3. Title _____

(Name, Title & Address)

Corporate Guarantor (Seal)

PRICE ADJUSTMENT UNDER CLAUSE 70.1 OF CONDITIONS OF CONTRACT

The source of indices and the weightages or coefficients for use in the adjustment formula under Clause 70 shall be as follows:

Cost Element	Description	Weightages	Applicable index
1	2	3	4
(i)	Fixed Portion	0.500	--
(ii)	Local Labour	0.100	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.
(iii)	Cement – in bags	0.150	“ “ “
(iv)	Asphalt	0.150	“ “ “
(v)	High Speed Diesel (HSD)	0.100	“ “ “
	Total	1.000	“ “ “

Notes:

- 1) Indices for “(ii)” to “(vi)” are taken from the Government of Pakistan Federal Bureau of Statistics, Monthly Statistical Bulletin. The base cost indices or prices shall be those applying 28 days prior to the latest day for submission of bids. Current indices or prices shall be those applying 28 days prior to the last day of the billing period.
- 2) Any fluctuation in the indices or prices of materials other than those given above shall not be subject to adjustment of the Contract Price.
- 3) Fixed portion shown here is for typical road project, Employer to determine the weightage of Fixed Portion considering only those cost elements having cost impact of seven (7) percent or more on his specific project.

(Employers using this price adjustment provisions may add or delete any elements as deemed appropriate to the project.)



FEDERATION INTERNATIONALE DES INGENIEURS-CONSEILS

CONSTRUCTION CONDITIONS OF CONTRACT FOR WORKS OF CIVIL ENGINEERING CONSTRUCTION

PART I GENERAL CONDITIONS WITH FORMS OF TENDER AND AGREEMENT

FOURTH EDITION 1987

Reprinted 1988 with editorial amendments

Reprinted in 1992 with further amendments

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TENDER (NOT USED)

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PART I - GENERAL CONDITIONS

Definitions and Interpretation

1.1 Definitions

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

- (a) (i) "Employer" means the person named as such in Part II of these Conditions and the legal successors in title to such person, but not (except with the consent of the Contractor) any assignee of such person.
- (ii) "Contractor" means the person whose tender has been accepted by the Employer and the legal successors in title to such person, but not (except with the consent of the Employer) any assignee of such person.
- (iii) "Subcontractor" means any person named in the Contract as a Subcontractor for a part of the Works or any person to whom a part of the Works has been subcontracted with the consent of the Engineer and the legal successors in title to such person, but not any assignee of any such person.
- (iv) "Engineer" means the person appointed by the Employer to act as Engineer for the purposes of the Contract and named as such in Part II of these Conditions.
- (v) "Engineer's Representative" means a person appointed from time to time by the Engineer under Sub-Clause 2.2.

- (b) (i) "Contract" means these Conditions (Parts I and II), the Specification, the Drawings, the Bill of Quantities, the Tender, the Letter of Acceptance, the Contract Agreement (if completed) and such further documents as may be expressly incorporated in the Letter of Acceptance or Contract Agreement (if completed).
- (ii) "Specification" means the specification of the Works included in the Contract and any modification thereof or addition thereto made under Clause 51 or submitted by the Contractor and approved by the Engineer.
- (iii) "Drawings" means all drawings, calculations and technical information of a like nature provided by the Engineer to the Contractor under the Contract and all drawings, calculations, samples, patterns, models, operation and maintenance manuals and other technical information of a like nature submitted by the Contractor and approved by the Engineer.
- (iv) "Bill of Quantities" means the priced and completed bill of quantities forming part of the Tender.
- (v) "Tender" means the Contractor's priced offer to the Employer for the

execution and completion of the Works and the remedying of any defects therein in accordance with the provisions of the Contract, as accepted by the Letter of Acceptance.

- (vi) "Letter of Acceptance" means the formal acceptance by the Employer of the Tender.
- (vii) "Contract Agreement" means the contract agreement (if any) referred to in Sub-Clause 9.1.
- (viii) "Appendix to Tender" means the appendix comprised in the form of Tender annexed to these Conditions.
- (c) (i) "Commencement Date" means the date upon which the Contractor receives the notice to commence issued by the Engineer pursuant to Clause 41.
- (ii) "Time for Completion" means the time for completing the execution of and passing the Tests on Completion of the Works or any Section or part thereof as stated in the Contract (or as extended under Clause 44) calculated from the Commencement Date.
- (d) (i) "Tests on Completion" means the tests specified in the Contract or otherwise agreed by the Engineer and the Contractor which are to be made by the Contractor before the Works of any Section or part thereof are taken over by the Employer.
- (ii) "Taking-Over Certificate" means a certificate issued pursuant to Clause 48.
- (e) (i) "Contract Price" means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works and the remedying of any defects therein in accordance with the provisions of the Contract.
- (ii) "Retention Money" means the aggregate of all monies retained by the Employer pursuant to Sub-Clause 60.2(a).
- (iii) "Interim Payment Certificate" means any certificate of payment issued by the Engineer other than the Final Payment Certificate.
- (iv) "Final Payment Certificate" means the certificate of payment issued by the Engineer pursuant to Sub-Clause 60.8.
- (f) (i) "Works" means the Permanent Works and the Temporary Works or either of them as appropriate.
- (ii) "Permanent Works" means the permanent works to be executed (including Plant) in accordance with the Contract

- (iii) "Temporary Works" means all temporary works of every kind (other than Contractor's Equipment) required in or about the execution and completion of the Works and the remedying of any defects therein.
- (iv) "Plant" means machinery, apparatus and the like intended to form or forming part of the Permanent Works.
- (v) "Contractor's Equipment" means all appliances and things of whatsoever nature (other than Temporary Works) required for the execution and completion of the Works and the remedying of any defects therein, but does not include Plant, materials or other things intended to form or forming part of the Permanent Works.
- (vi) "Section" means a part of the Works specifically identified in the Contract as a Section.
- (vii) "Site" means the places provided by the Employer where the Works are to be executed and any other places as may be specifically designated in the Contract as forming part of the Site.
- (g)
 - (i) "cost" means all expenditure properly incurred or to be incurred, whether, on or off the Site, including overhead and other charges properly allocable thereto but does not include any allowance for profit.
 - (ii) "day" means calendar day.
 - (iii) "foreign currency" means a currency of a country other than that in which the Works are to be located.
 - (iv) "writing" means any hand-written, type-written, or printed communication, including telex, cable and facsimile transmission.

1.2 **Headings and Marginal Notes**

The headings and marginal notes in these Conditions shall not be deemed part thereof or be taken into consideration in the interpretation or construction thereof or of the Contract.

1.3 **Interpretation**

Words importing persons or parties shall include firms and corporations and any organization having legal capacity.

1.4 **Singular and Plural**

Words importing the singular only also include the plural and vice versa where the context requires.

1.5 **Notices, Consents, Approvals, Certificates and Determinations**

Wherever in the Contract provision is made for the giving or issue of any notice, consent, approval, certificate or determination by any person, unless otherwise specified such notice, consent, approval, certificate or determination shall be in writing and the words "notify", "certify" or "determine" shall be construed

accordingly. Any such consent, approval, certificate or determination shall not unreasonably be withheld or delayed.

Engineer and Engineer's Representative

2.1 Engineer's Duties and Authority

- (a) The Engineer shall carry out the duties specified in the Contract.
- (b) The Engineer may exercise the authority specified in or necessarily to be implied from the Contract, provided, however, that if the Engineer is required, under the terms of his appointment by the Employer, to obtain the specific approval of the Employer before exercising any such authority, particulars of such requirements shall be set out in Part II of these Conditions. Provided further that any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Engineer.
- (c) Except as expressly stated in the Contract, the Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract.

2.2 Engineer's Representative

The Engineer's Representative shall be appointed by and be responsible to the Engineer and shall carry out such duties and exercise such authority as may be delegated to him by the Engineer under Sub-Clause 2.3.

2.3 Engineer's Authority to Delegate

The Engineer may from time to time delegate to the Engineer's Representative any of the duties and authorities vested in the Engineer and he may at any time revoke such delegation. Any such delegation or revocation shall be in writing and shall not take effect until a copy thereof has been delivered to the Employer and the Contractor.

Any communication given by the Engineer's Representative to the Contractor in accordance with such delegation shall have the same effect as though it had been given by the Engineer. Provided that:

- (a) any failure of the Engineer's Representative to disapprove any work, materials or Plant shall not prejudice the authority of the Engineer to disapprove such work, materials or Plant and to give instructions for the rectification thereof; and
- (b) if the Contractor questions any communication of the Engineer's Representative he may refer the matter to the Engineer who shall confirm, reverse or vary the contents of such communication.

2.4 Appointment of Assistants

The Engineer or the Engineer's Representative may appoint any number of persons to assist the Engineer's Representative in the carrying out of his duties under Sub-Clause 2.2. He shall notify to the Contractor the names, duties and scope of authority of such persons. Such assistants shall have no authority to issue any instructions to the Contractor save in so far as such instructions may be necessary to enable them to carry out their duties and to secure their acceptance of materials, Plant or workmanship as being in accordance with the Contract, and any instructions given by any of them for those purposes shall be deemed to have been given by the Engineer's Representative.

2.5 **Instructions in Writing**

Instructions given by the Engineer shall be in writing, provided that if for any reason the Engineer considers it necessary to give any such instruction orally, the Contractor shall comply with such instruction. Confirmation in writing of such oral instruction given by the Engineer, whether before or after the carrying out of the instruction, shall be deemed to be an instruction within the meaning of this Sub-Clause. Provided further that if the Contractor, within 7 days, confirms in writing to the Engineer any oral instruction of the Engineer and such confirmation is not contradicted in writing within 7 days by the Engineer, it shall be deemed to be an instruction of the Engineer.

The provisions of this Sub-Clause shall equally apply to instructions given by the Engineer's Representative and any assistants of the Engineer or the Engineer's Representative appointed pursuant to Sub-Clause 2.4.

2.6 **Engineer to Act Impartially**

Wherever, under the Contract, the Engineer is required to exercise his discretion by:

- (a) giving his decision, opinion or consent,
- (b) expressing his satisfaction or approval,
- (c) determining value, or

- (d) otherwise taking action which may affect the rights and obligations of the Employer or the Contractor

he shall exercise such discretion impartially within the terms of the Contract and having regard to all the circumstances. Any such decision, opinion, consent expression of satisfaction, or approval, determination of value or action may be opened up, reviewed or revised as provided in Clause 67.

Assignment and Subcontracting

3.1 **Assignment of Contract**

The Contractor shall not, without the prior consent of the Employer (which consent, notwithstanding the provisions of Sub-Clause 1.5, shall be at the sole discretion of the Employer), assign the Contract or any part thereof, or any benefit or interest therein or thereunder, otherwise than by:

- (a) a charge in favour of the Contractor's bankers of any monies due or to become due under the Contract, or
- (b) assignment to the Contractor's insurers (in cases where the insurers have discharged the Contractor's loss or liability) of the Contractor's right to obtain relief against any other party liable.

4.1 **Subcontracting**

The Contractor shall not subcontract the whole of the Works. Except where otherwise provided by the Contract, the Contractor shall not subcontract any part of the Works without the prior consent of the Engineer. Any such consent shall not relieve the Contractor from any liability or obligation under the Contract and he shall be responsible for the acts, defaults and neglects of any Subcontractor, his agents, servants or workmen as fully as if they were the acts, defaults or neglects of the Contractor, his agents servants or workmen.

Provided that the Contractor shall not be required to obtain such consent for:

- (a) the provision of labour,
- (b) the purchase of materials which are in accordance with the standards specified in the Contract,
- (c) the subcontracting of any part of the Works for which the Subcontractor is named in the Contract.

4.2 **Assignment of Subcontractors' Obligations**

In the event of a Subcontractor having undertaken towards the Contractor in respect of the work executed, or the goods, materials, Plant or services supplied by such Subcontractor, any continuing obligation extending for a period exceeding that of the Defects Liability Period under the Contract, the Contractor shall at any time, after the expiration of such Period, assign to the Employer, at the Employer's request and cost, the benefit of such obligation for the unexpired duration thereof.

Contract Documents

5.1 **Language/s and Law**

There is stated in Part II of these Conditions:

- (a) the language or languages in which the Contract documents shall be drawn up, and
- (b) the country or state the law of which shall apply to the Contract and according to which the Contract shall be construed.

If the said documents are written in more than one language, the language according to which the Contract shall be construed and interpreted is also stated in Part II of these Conditions, being therein

designated the "Ruling Language".

5.2 Priority of Contract Documents

The several documents forming the Contract are to be taken as mutually explanatory of one another, but in case of ambiguities or discrepancies the same shall be explained and adjusted by the Engineer who shall thereupon issue to the Contractor instructions thereon and in such event, unless otherwise provided in the Contract, the priority of the documents forming the Contract shall be as follows:

- (1) The Contract Agreement (if completed);
- (2) The Letter of Acceptance;
- (3) The Tender;
- (4) Part II of these Conditions;
- (5) Part I of these Conditions; and
- (6) Any other document forming part of the Contract.

6.1 Custody and Supply of Drawings and Documents

The Drawings shall remain in the sole custody of the Engineer, but two copies thereof shall be provided to the Contractor free of charge. The Contractor shall make at his own cost any further copies required by him. Unless it is strictly necessary for the purposes of the Contract, the Drawings, Specification and other documents provided by the Employer or the Engineer shall not, without the consent of the Engineer, be used or communicated to a third party by the Contractor. Upon issue of the Defects Liability Certificate, the Contractor shall return to the Engineer all Drawings, Specification and other documents provided under the Contract.

The Contractor shall supply to the Engineer four copies of all Drawings, specification and other documents submitted by the Contractor and approved by the Engineer in accordance with Clause 7, together with a reproducible copy of any material which cannot be reproduced to an equal standard by photocopying. In addition the Contractor shall supply such further copies of such Drawings, Specification and other documents as the Engineer may request in writing for the use of the Employer, who shall pay the cost thereof.

6.2 One Copy of Drawings to be Kept on Site

One copy of the Drawings, provided to or supplied by the Contractor as aforesaid, shall be kept by the Contractor on the Site and the same shall at all reasonable times be available for inspection and use by the Engineer and by any other person authorised by the Engineer in writing.

6.3 Disruption of Progress

The Contractor shall give notice to the Engineer, with a copy to the Employer, whenever planning or execution of the Works is likely to be delayed or disrupted unless any further drawing or instruction is issued by the Engineer within a reasonable time. The notice shall include details of the drawing or instruction required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

6.4 Delay and Cost of Delay of Drawings

If, by reason of any failure or inability of the Engineer to issue, within a time reasonable in all the circumstances, any drawing or instruction for which notice has been given by the Contractor in accordance with Sub-Clause 6.3, the Contractor suffers delay and/or incurs costs then the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.

6.5 Failure by Contractor to Submit Drawings

If the failure or inability of the Engineer to issue any drawings or instructions is caused in whole or in part by the failure of the Contractor to submit Drawings, Specification or other documents which he is required to submit under the Contract, the Engineer shall take such failure by the Contractor into account when making his determination pursuant to Sub-Clause 6.4.

7.1 Supplementary Drawings and Instructions

The Engineer shall have authority to issue to the Contractor, from time to time, such supplementary Drawings and instructions as shall be necessary for the purpose of the proper and adequate execution and completion of the Works and the remedying of any defects therein. The Contractor shall carry out and be bound by the same.

7.2 Permanent Works Designed by Contractor

Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall submit to the Engineer, for approval:

- (a) such drawings, specifications, calculations and other information as shall be necessary to satisfy the Engineer as to the suitability and adequacy of that design, and
- (b) operation and maintenance manuals together with drawings of the Permanent Works as completed, in sufficient detail to enable the Employer to operate, maintain, dismantle, reassemble and adjust the Permanent Works incorporating that design. The Works shall not be considered to be completed for the purposes of taking over in accordance with Clause 48 until such operation and maintenance manuals together with drawings on completion have been submitted to and approved by the Engineer.

7.3 Responsibility Unaffected by Approval

Approval by the Engineer, in accordance with Sub-Clause 7.2, shall not relieve the Contractor of any of his responsibilities under the Contract.

General Obligations

8.1 Contractor's General Responsibilities

The Contractor shall, with due care and diligence, design (to the extent provided for by the Contract), execute and complete the Works and remedy any defects therein in accordance with the provisions of the Contract. The Contractor shall provide all superintendance, labour, material, Plant, Contractor's Equipment and all other things, whether of a temporary or permanent nature, required in and for such design, execution, completion and remedying of any defects, so far as the necessity for providing the same is specified in or is reasonably to be inferred from the Contract.

8.2 Site Operations and Methods of Construction

The Contractor shall take full responsibility for the adequacy, stability and safety of all Site operations and methods of construction. Provided that the Contractor shall not be responsible (except as stated hereunder or as may be otherwise agreed) for the design or specification of Permanent Works, or for the design or specification of any Temporary Works not prepared by the Contractor. Where the Contract expressly provides that part of the Permanent Works shall be designed by the Contractor, he shall be fully responsible for that part of such Works, notwithstanding any approval by the Engineer.

9.1 Contract Agreement

The Contractor shall, if called upon so to do, enter into and execute the Contract Agreement, to be prepared and completed at the cost of the Employer, in the form annexed to these Conditions with such modification as may be necessary.

10.1 Performance Security

If the Contract requires the Contractor to obtain security for his proper performance of the Contract, he shall obtain and provide to the Employer, such security within 28 days after the receipt of the Letter of Acceptance, in the sum stated in the Appendix to Tender. When providing such security to the Employer, the Contractor shall notify the Engineer of so doing. Such security shall be in the form annexed to these Conditions or in such other form as may be agreed between the Employer and the Contractor. The institution providing such security shall be subject to the approval of the Employer. The cost of complying with the requirements of this Clause shall be borne by the Contractor, unless the Contract otherwise provides.

10.2 Period of Validity of Performance Security

The performance security shall be valid until the Contractor has executed and completed the Works and remedied any defects therein in accordance with the Contract. No claim shall be made against such security after the issue of the Defects Liability Certificate in accordance with Sub-Clause 62.1 and such security shall be returned to the Contractor within 14 days of the issue of the said Defects Liability Certificate.

10.3 **Claims under Performance Security**

Prior to making a claim under the performance security the Employer shall, in every case, notify the Contractor stating the nature of the default in respect of which the claim is to be made.

11.1 **Inspection of Site**

The Employer shall have made available to the Contractor, before the submission by the Contractor of the Tender, such data on hydrological and sub-surface conditions as have been obtained by or on behalf of the Employer from investigations undertaken relevant to the Works but the Contractor shall be responsible for his own interpretation thereof.

The Contractor shall be deemed to have inspected and examined the Site and its surroundings and information available in connection therewith and to have satisfied himself (so far as is practicable, having regard to considerations of cost and time) before submitting his Tender, as to:

- (a) the form and nature thereof, including the sub-surface conditions,
- (b) the hydrological and climatic conditions,
- (c) the extent and nature of work and materials necessary for the execution and completion of the Works and the remedying of any defects therein, and
- (d) the means of access to the Site and the accommodation he may require, and, in general, shall be deemed to have obtained all necessary information, subject as above mentioned, as to risks, contingencies and all other circumstances which may influence or affect his Tender.

The Contractor shall be deemed to have based his Tender on the data made available by the Employer and on his own inspection and examination, all as aforementioned.

12.1 **Sufficiency of Tender**

The Contractor shall be deemed to have satisfied himself as to the correctness and sufficiency of the Tender and of the rates and prices stated in the Bill of Quantities, all of which shall, except insofar as it is otherwise provided in the Contract, cover all his obligations under the Contract (including those in respect of the supply of goods, materials, Plant or services or of contingencies for which there is a Provisional Sum) and all matters and things necessary for the proper execution and completion of the Works and the remedying of any defects therein.

12.2 **Not Foreseeable Physical Obstructions or Conditions**

If, however, during the execution of the Works the Contractor encounters physical obstructions or physical conditions, other than climatic conditions on the Site, which obstructions or conditions were, in his opinion, not foreseeable by an experienced contractor, the Contractor shall forthwith give notice thereof to the Engineer, with a copy to the Employer. On receipt of such notice, the Engineer shall if in his opinion such obstructions or conditions could not have been reasonably foreseen by an

experienced contractor, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of any costs which may have been incurred by the Contractor by reason of such obstructions or conditions having been encountered, which shall be added to the Contract Price,

and shall notify the Contractor accordingly, with a copy to the Employer. Such determination shall take account of any instruction which the Engineer may issue to the Contractor in connection therewith, and any proper and reasonable measures acceptable to the Engineer which the Contractor may take in the absence of specific instructions from the Engineer.

13.1 Work to be in Accordance with Contract

Unless it is legally or physically impossible, the Contractor shall execute and complete the Works and remedy any defects therein in strict accordance with the Contract to the satisfaction of the Engineer. The Contractor shall comply with and adhere strictly to the Engineer's instructions on any matter, whether mentioned in the Contract or not, touching or concerning the Works. The Contractor shall take instructions only from the Engineer (or his delegate).

14.1 Programme to be Submitted

The Contractor shall, within the time stated in Part II of these Conditions after the date of the Letter of Acceptance, submit to the Engineer for his consent a programme, in such form and detail as the Engineer shall reasonably prescribe, for the execution of the Works. The Contractor shall, whenever required by the Engineer, also provide in writing for his information a general description of the arrangements and methods which the Contractor proposes to adopt for the execution of the Works.

14.2 Revised Programme

If at any time it should appear to the Engineer that the actual progress of the Works does not conform to the programme to which consent has been given under Sub-Clause 14.1, the Contractor shall produce, at the request of the Engineer, a revised programme showing the modifications to such programme necessary to ensure completion of the Works within the Time for Completion.

14.3 Cash Flow Estimate to be Submitted

The Contractor shall, within the time stated in Part II of these Conditions after the date of the Letter of Acceptance, provide to the Engineer for his information a detailed cash flow estimate, in quarterly periods, of all payments to which the Contractor will be entitled under the Contract and the Contractor shall subsequently supply revised cash flow estimates at quarterly intervals, if required to do so by the Engineer.

14.4

Contractor not Relieved of Duties or Responsibilities

The submission to and consent by the Engineer of such programmes or the provision of such general descriptions or cash flow estimates shall not relieve the Contractor of any of his duties or responsibilities under the Contract.

15.1

Contractor's Superintendence

The Contractor shall provide all necessary superintendence during the execution of the Works and as long thereafter as the Engineer may consider necessary for the proper fulfilling of the Contractor's obligations under the Contract. The Contractor, or a competent and authorised representative approved of by the Engineer, which approval may at any time be withdrawn, shall give his whole time to the superintendence of the Works. Such authorised representative shall receive, on behalf of the Contractor, instructions from the Engineer.

If approval of the representative is withdrawn by the Engineer, the Contractor shall, as soon as is practicable, having regard to the requirement of replacing him as hereinafter mentioned, after receiving notice of such withdrawal, remove the representative from the Works and shall not thereafter employ him again on the Works in any capacity and shall replace him by another representative approved by the Engineer.

16.1

Contractor's Employees

The Contractor shall provide on the Site in connection with the execution and completion of the Works and the remedying of any defects therein:

- (a) only such technical assistants as are skilled and experienced in their respective callings and such foremen and leading hands as are competent to give proper superintendence of the Works, and
- (b) such skilled, semi skilled and unskilled labour as is necessary for the proper and timely fulfilling of the Contractor's obligations under the Contract.

16.2

Engineer at Liberty to Object

The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the Works any person provided by the Contractor who, in the opinion of the Engineer, misconducts himself, or is incompetent or negligent in the proper performance of his duties, or whose presence on Site is otherwise considered by the Engineer to be undesirable, and such person shall not be again allowed upon the Works without the consent of the Engineer. Any person so removed from the Works shall be replaced as soon as possible.

17.1

Setting-out

The Contractor shall be responsible for:

- (a) the accurate setting-out of the Works in relation to original points, lines and levels of reference given by the Engineer in writing,

- (b) the correctness, subject as above mentioned of the position, levels dimensions and alignment of all parts of the Works, and
- (c) the provision of all necessary instruments, appliances and labour in connection with the foregoing responsibilities.

If, at any time during the execution of the Works, any error appears in the position, levels, dimensions or alignment of any part of the Works, the Contractor, on being required so to do by the Engineer, shall, at his own cost, rectify such error to the satisfaction of the Engineer, unless such error is based on incorrect data supplied in writing by the Engineer, in which case the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.

The checking of any setting-out or of any line or level by the Engineer shall not in any way relieve the Contractor of his responsibility for the accuracy thereof and the Contractor shall carefully protect and preserve all bench-marks, sight-rails, pegs and other things used in setting-out the Works.

18.1 Boreholes and Exploratory Excavation

If, at any time during the execution of the Works, the Engineer requires the Contractor to make boreholes or to carry out exploratory excavation, such requirement shall be the subject of an instruction in accordance with Clause 51, unless an item or a Provisional Sum in respect of such work is included in the Bill of Quantities.

19.1 Safety, Security and Protection of the Environment

The Contractor shall, throughout the execution and completion of the Works and the remedying of any defects therein:

- (a) have full regard for the safety of all persons entitled to be upon the Site and keep the Site (so far as the same is under his control) and the Works (so far as the same are not completed or occupied by the Employer) in an orderly state appropriate to the avoidance of danger to such persons,
- (b) provide and maintain at his own cost all lights, guards, fencing, warning signs and watching, when and where necessary or required by the Engineer or by any duly constituted authority, for the protection of the Works or for the safety and convenience of the public or others, and
- (c) take all reasonable steps to protect the environment on and off the Site and to avoid damage or nuisance to persons or to property of the public or others resulting from pollution, noise or other causes arising as a consequence of his methods of operation.

19.2 **Employer's Responsibilities**

If under Clause 31 the Employer shall carry out work on the Site with his own workmen he shall, in respect of such work:

- (a) have full regard to the safety of all persons entitled to be upon the Site, and
- (b) keep the Site in an orderly state appropriate to the avoidance of danger to such persons.

If under Clause 31 the Employer shall employ other contractors on the Site he shall require them to have the same regard for safety and avoidance of danger.

20.1 **Care of Works**

The Contractor shall take full responsibility for the care of the Works and materials and Plant for incorporation therein from the Commencement Date until the date of issue of the Taking-Over Certificate for the whole of the Works, when the responsibility for the said care shall pass to the Employer. Provided that:

- (a) if the Engineer issues a Taking-Over Certificate for any Section or part of the Permanent Works the Contractor shall cease to be liable for the care of that Section or part from the date of issue of the Taking-Over Certificate, when the responsibility for the care of that Section or part shall pass to the Employer, and
- (b) the Contractor shall take full responsibility for the care of any outstanding Works and materials and Plant for incorporation therein which he undertakes to finish during the Defects Liability Period until such outstanding Works have been completed pursuant to Clause 49.

20.2 **Responsibility to Rectify Loss or Damage**

If any loss or damage happens to the Works, or any part thereof, or materials or Plant for incorporation therein, during the period for which the Contractor is responsible for the care thereof, from any cause whatsoever, other than the risks defined in Sub-Clause 20.4, the Contractor shall, at his own cost, rectify such

loss or damage so that the Permanent Works conform in every respect with the provisions of the Contract to the satisfaction of the Engineer. The Contractor shall also be liable for any loss or damage to the Works occasioned by him in the course of any operations carried out by him for the purpose of complying with his obligations under Clauses 49 and 50.

20.3 **Loss or Damage Due to Employer's Risks**

In the event of any such loss or damage happening from any of the risks defined in Sub-Clause 20.4, or in combination with other risks, the Contractor shall, if and to the extent required by the Engineer, rectify the loss or damage and the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer. In the case of a combination of risks causing loss or damage any such determination shall take into

account the proportional responsibility of the Contractor and the Employer.

20.4 **Employer's Risks**

The Employer's risks are:

- (a) war, hostilities (whether war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, revolution, insurrection, or military or usurped power, or civil war,
- (c) 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 thereof,
- (d) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,
- (e) riot, commotion or disorder, unless solely restricted to employees of the Contractor or of his Subcontractor and arising from the conduct of the Works,
- (f) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract,
- (g) loss or damage to the extent that it is due to the design of the Works, other than any part of the design provided by the Contractor or for which the Contractor is responsible, and
- (h) any operation of the forces of nature against which an experienced contractor could not reasonably have been expected to take precautions.

21.1 **Insurance of Works and Contractor's Equipment**

The Contractor shall, without limiting his or the Employer's obligations and responsibilities under Clause 20, insure:

- (a) the Works, together with materials and Plant for incorporation therein, to the full replacement cost (the term "cost" in this context shall include profit),
- (b) an additional sum of 15 per cent of such replacement cost, or as may be specified in Part II of these Conditions, to cover any additional costs of and incidental to the rectification of loss or damage including professional fees and the cost of demolishing and removing any part of the Works and of removing debris of whatsoever nature, and
- (c) the Contractor's Equipment and other things brought onto the Site by the Contractor, for a sum sufficient to provide for their replacement at the Site.

21.2 **Scope of Cover**

The insurance in paragraphs (a) and (b) of Sub-Clause 21.1 shall be in the joint names of the Contractor and the Employer and shall cover:

- (a) the Employer and the Contractor against all loss or damage from whatsoever cause arising, other than as provided in Sub-Clause 21.4, from the start of work at the Site until the date of issue of the relevant Taking-Over Certificate in respect of the Works or any Section or part thereof as the case may be, and
- (b) the Contractor for his liability:
 - (i) during the Defects Liability Period for loss or damage arising from a cause occurring prior to the commencement of the Defects Liability Periods, and
 - (ii) for loss or damage occasioned by the Contractor in the course of any operations carried out by him for the purpose of complying with his obligations under Clauses 49 and 50.

21.3 **Responsibility for Amounts not Recovered**

Any amounts not insured or not recovered from the insurers shall be borne by the Employer or the Contractor in accordance with their responsibilities under Clause 20.

21.4 **Exclusions**

There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by:

- (a) war, hostilities (where war be declared or not), invasion, act of foreign enemies,
- (b) rebellion, revolution, insurrection, or military or usurped power, or civil war,
- (c) 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 thereof, or
- (d) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds.

22.1 **Damage to Persons and Property**

The Contractor shall, except if and so far as the Contract provides otherwise, indemnify the Employer against all losses and claims in respect of:

- (a) death of or injury to any person, or
- (b) loss of or damage to any property (other than the Works),

which may arise out of or in consequence of the execution and completion of the Works and the remedying of any defects therein, and against all claims, proceedings, damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, subject to the exceptions defined in Sub-Clause 22.2.

22.2 **Exceptions**

The "exceptions" referred to in Sub-Clause 22.1 are:

- (a) the permanent use or occupation of land by the Works, or any part thereof,
- (b) the right of the Employer to execute the Works, or any part thereof, on, over, under, is or through any land,
- (c) damage to property which is the unavoidable result of the execution and completion of the Works, or the remedying of any defects therein, in accordance with the Contract, and
- (d) death of or injury to persons or loss of or damage to property resulting from any act or neglect of the Employer, his agents servants or other contractors, not being employed by the Contractor, or in respect of any claims, proceedings, damages, costs, charges and expenses in respect thereof or in relation thereto or, where the injury or damage was contributed to by the Contractor, his servants or agents, such part of the said injury or damage as may be just and equitable having regard to the extent of the responsibility of the Employer, his servants or agents or other contractors for the injury or damage.

22.3 **Indemnity by Employer**

The Employer shall indemnify the Contractor against all claims, proceedings, damages, costs, charges and expenses in respect of the matters referred to in the exceptions defined in Sub-Clause 22.2

23.1 **Third Party Insurance (including Employer's Property)**

The Contractor shall, without limiting his or the Employer's obligation and responsibilities under Clause 22, insure, in the joint names of the Contractor and the Employer, against liabilities for death of or injury to any person (other than as provided in Clause 24) or loss of or damage to any property (other than the Works) arising out of the performance of the Contract, other than the exceptions defined in paragraphs (a), (b) and (c) of Sub-Clause 22.2.

23.2 **Minimum Amount of Insurance**

Such insurance shall be for at least the amount stated in the Appendix to Tender.

23.3 **Cross Liabilities**

The insurance policy shall include a cross liability clause such that the insurance

shall apply to the Contractor and to the Employer as separate insureds.

24.1 Accident or Injury to Workmen

The Employer shall not be liable for or in respect of any damages or compensation payable to any workman or other person in the employment of the Contractor or any Subcontractor, other than death or injury resulting from any act or default of the Employer, his agents or servants. The Contractor shall indemnify and keep indemnified the Employer against all such damages and compensation, other than those for which the Employer is liable as aforesaid, and against all claims, proceedings, damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto.

24.2 Insurance Against Accident to Workmen

The Contractor shall insure against such liability and shall continue such insurance during the whole of the time that any persons are employed by him on the Works. Provided that, in respect of any persons employed by any Subcontractor, the Contractor's obligations to insure as aforesaid under the Sub-Clause shall be satisfied if the Subcontractor shall have insured against the liability in respect of such persons in such manner that the Employer is indemnified under the policy, but the Contractor shall require such Subcontractor to produce to the Employer, when required, such policy of insurance and the receipt for the payment of the current premium.

25.1 Evidence and Terms of Insurances

The Contractor shall provide evidence to the Employer prior to the start of work at the Site that the insurances required under the Contract have been effected and shall, within 84 days of the Commencement Date, provide the insurance policies to the Employer. When providing such evidence and such policies to the Employer, the Contractor shall notify the Engineer of so doing. Such insurance policies shall be consistent with the general terms agreed prior to the issue of the Letter of Acceptance. The Contractor shall effect all insurances for which he is responsible with insurers and in terms approved by the Employer.

25.2 Adequacy of Insurances

The Contractor shall notify the insurers of changes in the nature, extent or programme for the execution of the Works and ensure the adequacy of the insurances at all times in accordance with the terms of the Contract and shall, when required, produce to the Employer the insurance policies in force and the receipts for payment of the current premiums.

25.3 Remedy on Contractor's Failure to Insure

If the Contractor fails to effect and keep in force any of the insurances required under the Contract, or fails to provide the policies to the Employer within the period required by Sub-Clause 25.1, then and in any such case the Employer may effect and keep in force any such insurances and pay any premium as may be necessary for that purpose and from time to time deduct the amount so paid from any monies due or to become due to the Contractor, or recover the same as a debt due from the Contractor.

25.4 **Compliance with Policy Conditions**

In the event that the Contractor or the Employer fails to comply with conditions imposed by the insurance policies effected pursuant to the Contract, each shall indemnify the other against all losses and claims arising from such failure.

26.1 **Compliance with Statutes, Regulations**

The Contractor shall conform in all respects, including by the giving of all notices and the paying of all fees, with the provisions of:

- (a) any National or State Statute, Ordinance, or other Law, or any regulation, or bye-law of any local or other duly constituted authority in relation to the execution and completion of the Works and the remedying of any defects therein, and
- (b) the rules and regulations of all public bodies and companies whose property or rights are affected or may be affected in any way by the Works,

and the Contractor shall keep the Employer indemnified against all penalties and liability of every kind for breach of any such provisions. Provided always that the Employer shall be responsible for obtaining any planning, zoning or other similar permission required for the Works to proceed and shall indemnify the Contractor in accordance with Sub-Clause 22.3.

27.1 **Fossil**

All fossils, coins, articles of value or antiquity and structures and other remains or things of geological or archaeological interest discovered on the Site shall, as between the Employer and the Contractor, be deemed to be the absolute property of the Employer. The Contractor shall take reasonable precautions to prevent his workmen or any other persons from removing or damaging any such article or thing and shall, immediately upon discovery thereof and before removal, acquaint the Engineer of such discovery and carry out the Engineer's instructions for dealing with the same. If, by reason of such instructions, the Contractor suffers delay and/or incurs costs then the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer.

28.1 **Patent Rights**

The Contractor shall save harmless and indemnify the Employer from and against all claims and proceedings for or on account of infringement of any patent rights, design trademark or name or other protected rights in respect of any Contractor's

Equipment, materials or Plant used for or in connection with or for incorporation in the Works and from and against all damages, costs, charges and expenses whatsoever in respect thereof or in relation thereto, except where such infringement results from compliance with the design or Specification provided by the Engineer.

28.2 **Royalties**

Except where otherwise stated, the Contractor shall pay all tonnage and other royalties, rent and other payments or compensation, if any, for getting stone, sand, gravel, clay or other materials required for the Works.

29.1 **Interference with Traffic and Adjoining Properties**

All operations necessary for the execution and completion of the Works and the remedying of any defects therein shall, so far as compliance with the requirements of the Contract permits, be carried on so as not to interfere unnecessarily or improperly with:

- (a) the convenience of the public, or
- (b) the access to, use and occupation of public or private roads and footpaths to or of properties whether in the possession of the Employer or of any other person.

The Contractor shall save harmless and indemnify the Employer in respect of all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of, or in relation to, any such matters insofar as the Contractor is responsible therefor.

30.1 **Avoidance of Damage to Roads**

The Contractor shall use every reasonable means to prevent any of the roads or bridges communicating with or on the routes to the Site from being damaged or injured by any traffic of the Contractor or any of his Subcontractors and, in particular, shall select routes, choose and use vehicles and restrict and distribute loads so that any such extraordinary traffic as will inevitably arise from the moving of materials, Plant, Contractor's Equipment or Temporary Works from and to the Site shall be limited, as far as reasonably possible, and so that no unnecessary damage or injury may be occasioned to such roads and bridges.

30.2 **Transport of Contractor's Equipment or Temporary Works**

Save insofar as the Contract otherwise provides, the Contractor shall be responsible for and shall pay the cost of strengthening any bridges or altering or improving any road communicating with or on the routes to the Site to facilitate the movement of Contractor's Equipment or Temporary Works and the Contractor shall indemnify and keep indemnified the Employer against all claims for damage to any such road or bridge caused by such movement, including such claims as may be made directly against the Employer, and shall negotiate and pay all claims arising solely out of such damage.

30.3 **Transport of Materials or Plant**

If, notwithstanding Sub-Clause 30.1, any damage occurs to any bridge or road

communicating with or on the routes to the Site arising from the transport of materials or Plant, the Contractor shall notify the Engineer with a copy to the Employer, as soon as he becomes aware of such damage or as soon as he receives any claim from the authority entitled to make such claim. Where under any law or regulation the haulier of such materials or Plant is required to indemnify the road authority against damage the Employer shall not be liable for any costs, charges or expenses in respect thereof or in relation thereto. In other cases the Employer shall negotiate the settlement of and pay all sums due in respect of such claim and shall indemnify the Contractor in respect thereof and in respect of all claims, proceedings damages, costs, charges and expenses in relation thereto. Provided that if and so far as any such claim or part thereof is, in the opinion of the Engineer, due to any failure on the part of the Contractor to observe and perform his obligations under Sub-Clause 30.1, then the amount determined by the Engineer, after due consultation with the Employer and the Contractor, to be due to such failure shall be recoverable from the Contractor by the Employer and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Provided also that the Employer shall notify the Contractor whenever a settlement is to be negotiated and, where any amount may be due from the Contractor, the Employer shall consult with the Contractor before such settlement is agreed.

30.4 Waterborne Traffic

Where the nature of the Works is such as to require the use by the Contractor of waterborne transport the foregoing provisions of this Clause shall be construed as though "road" included a lock, dock, sea wall or other structure related to a waterway and "vehicle" included craft, and shall have effect accordingly.

31.1 Opportunities for Other Contractors

The Contractor shall, in accordance with the requirements of the Engineer, afford all reasonable opportunities for carrying out their work to:

- (a) any other contractors employed by the Employer and their workmen,
- (b) the workmen of the Employer, and
- (c) the workmen of any duly constituted authorities who may be employed in the execution on or near the Site of any work not included in the Contract or of any contract which the Employer may enter into in connection with or ancillary to the Works.

31.2 Facilities for Other Contractors

If, however, pursuant to Sub-Clause 31.1 the Contractor shall, on the written request of the Engineer:

- (a) make available to any other contractor, or to the Employer or any such authority, any roads or ways for the maintenance of which the Contractor is responsible,

- (b) permit the use, by any such, of Temporary Works or Contractor's Equipment on the Site, or
- (c) provide any other service of whatsoever nature for any such,

the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.

32.1 Contractor to Keep Site Clear

During the execution of the Works the Contractor shall keep the Site reasonably free from all unnecessary obstruction and shall store or dispose of any Contractor's Equipment and surplus materials and clear away and remove from the Site any wreckage, rubbish or Temporary Works no longer required.

33.1 Clearance of Site on Completion

Upon the issue of any Taking-Over Certificate the Contractor shall clear away and remove from that part of the Site to which such Taking-Over Certificate relates all Contractor's Equipment, surplus materials, rubbish and Temporary Works of every kind, and leave such part of the Site and Works clean and in a workmanlike condition to the satisfaction of the Engineer. Provided that the Contractor shall be entitled to retain on Site, until the end of the Defects Liability Period, such materials, Contractor's Equipment and Temporary Works as are required by him for the purpose of fulfilling his obligations during the Defects Liability Period.

Labour

34.1 Engagement of Staffs and Labour

The Contractor shall, unless otherwise provided in the Contract, make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport.

35.1 Returns of Labour and Contractor's Equipment

The Contractor shall, if required by the Engineer, deliver to the Engineer a return in detail, in such form and at such intervals as the Engineer may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the Contractor on the Site and such information respecting Contractor's Equipment as the Engineer may require.

Materials, Plant and Workmanship

36.1 Quality of Materials, Plant and Workmanship

All materials, Plant and workmanship shall be:

- (a) of the respective kinds described in the Contract and in accordance with the Engineer's instructions, and
- (b) subjected from time to time to such tests as the Engineer may require at the place of manufacture, fabrication or preparation, or on the Site or at such other place or places as may be specified in the Contract, or at all or any of such places.

The Contractor shall provide such assistance, labour, electricity, fuels, stores, apparatus and instruments as are normally required for examining, measuring and testing any materials or Plant and shall supply samples of materials, before incorporation in the Works, for testing as may be selected and required by the Engineer.

36.2 Cost of Samples

All samples shall be supplied by the Contractor at his own cost if the supply thereof is clearly intended by or provided for in the Contract.

36.3 Cost of Tests

The cost of making any test shall be borne by the Contractor if such test is:

- (a) clearly intended by or provided for in the Contract, or
- (b) particularised in the Contract (in cases only for a test under load or of a test to ascertain whether the design of any finished or partially finished work is appropriate for the purposes which it was intended to fulfil) in sufficient detail to enable the Contractor to price or allow for the same in his Tender.

36.4 Cost of Tests not Provided for

If any test required by the Engineer which is:

- (a) not intended by or provided for,
- (b) (in the cases above mentioned) not so particularised, or
- (c) (through so intended or provided for) required by the Engineer to be carried out at any place other than the Site or the place of manufacture, fabrication or preparation of the materials or Plant tested,

shows the materials, Plant or workmanship not to be in accordance with the provisions of the Contract to the satisfaction of the Engineer, then the cost of such

test shall be borne by the Contractor, but in any other case Sub-Clause 36.5 shall apply.

36.5 Engineer's Determination where Tests not Provided for

Where, pursuant to Sub-Clause 36.4, this Sub-Clause applies the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time of which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price,

and shall notify the Contractor accordingly, with a copy to the Employer.

37.1 Inspection of Operations

The Engineer, and any person authorised by him, shall at all reasonable times have access to the Site and to all workshops and places where materials or Plant are being manufactured, fabricated or prepared for the Works and the Contractor shall afford every facility for and every assistance in obtaining the right to such access.

37.2 Inspection and Testing

The Engineer shall be entitled, during manufacture, fabrication or preparation to inspect and test the materials and Plant to be supplied under the Contract. If materials or Plant are being manufactured, fabricated or prepared in workshops or places other than those of the Contractor, the Contractor shall obtain permission for the Engineer to carry out such inspection and testing in those workshops or places. Such inspection or testing shall not release the Contractor from any obligation under the Contract.

37.3 Dates for Inspection and Testing

The Contractor shall agree with the Engineer on the time and place for the inspection or testing of any materials or Plant as provided in the Contract. The Engineer shall give the Contractor not less than 24 hours notice of his intention to carry out the inspection or to attend the tests. If the Engineer, or his duly authorised representative, does not attend on the date agreed, the Contractor may, unless otherwise instructed by the Engineer, proceed with the tests, which shall be deemed to have been made in the presence of the Engineer. The Contractor shall forthwith forward to the Engineer duly certified copies of the tests readings. If the Engineer has not attended the tests, he shall accept the said readings as accurate.

37.4 Rejection

If, at the time and place agreed in accordance with Sub-Clause 37.3, the materials or Plant are not ready for inspection or testing or if, as a result of the inspection or testing referred to in this Clause, the Engineer determines that the materials or Plant are defective or otherwise not in accordance with the Contract, he may reject the materials or Plant and shall notify the Contractor thereof immediately. The notice shall state the Engineer's objections with reasons. The Contractor shall then

promptly make good the defect or ensure that rejected materials or Plant comply with the Contract. If the Engineer so requests, the tests of rejected materials or Plant shall be made or repeated under the same terms and conditions. All costs incurred by the Employer by the repetition of the test shall after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer and may be deducted from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

37.5

Independent Inspection

The Engineer may delegate inspection and testing of materials or Plant to an independent inspector. Any such delegation shall be effected in accordance with Sub-Clause 2.4 and for this purpose such independent inspector shall be considered as an assistant of the Engineer. Notice of such appointment (not being less than 14 days) shall be given by the Engineer to the Contractor.

38.1

Examination of Work before Covering up

No part of the works shall be covered up or put out of view without the approval of the Engineer and the Contractor shall afford full opportunity for the Engineer to examine and measure any such part of the Works which is about to be covered up or put out of view and to examine foundations before any part of the Works is placed thereon. The Contractor shall give notice to the Engineer whenever any such part of the Works or foundations is or are ready or about to be ready for examination and the Engineer shall, without unreasonable delay, unless he considers it unnecessary and advises the Contractor accordingly, attend for the purpose of examining and measuring such part of the Works or of examining such foundations.

38.2

Uncovering and Making Openings

The Contractor shall uncover any part of the Works or make openings in or through the same as the Engineer may from time to time instruct and shall reinstate and make good such part. If any such part has been covered up or put out of view after compliance with the requirement of Sub-Clause 38.1 and is found to be executed in accordance with the Contract, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount the Contractor's costs in respect of such of uncovering, making openings in or through, reinstating and making good the same, which shall be added to the Contract Price, and shall notify the Contractor accordingly, with a copy to the Employer. In any other case all costs shall be borne by the Contractor.

39.1

Removal of Improper Work, Materials or Plant

The Engineer shall have authority to issue instructions from time to time, for:

(a) the removal from the Site, within such time or times as may be specified in the instruction, of any materials or Plant which, in the opinion of the Engineer, are not in accordance with the Contract,

(b) the substitution of proper and suitable materials or Plant, and

(c) the removal and proper re-execution, notwithstanding any previous test thereof or interim payment therefor, of any work which, in respect of

- (i) materials, Plant or workmanship, or
- (ii) design by the Contractor or for which he is responsible,

is not, in the opinion of the Engineer, in accordance with the Contract.

39.2 **Default of Contractor in Compliance**

In case of default on the part of Contractor in carrying out such instruction within the time specified therein or, if none, within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

Suspension

40.1 **Suspension of Work**

The Contractor shall, on the instructions of the Engineer, suspend the progress of the Works or any part thereof for such time and in such manner as the Engineer may consider necessary and shall, during such suspension, properly protect and secure the Works or such part thereof so far as is necessary in the opinion of the Engineer. Unless such suspension is:

- (a) otherwise provided for in the Contract,
- (b) necessary by reason of some default of or breach of contract by the Contractor or for which he is responsible,
- (c) necessary by reason of climatic conditions of the Site, or
- (d) necessary for the proper execution of the Works or for the safety of the Works or any part thereof (save to the extent that such necessity arises from any act or default by the Engineer or the Employer or from any of the risks defined in Sub-Clause 20.4),

Sub-Clause 40.2 shall apply.

40.2 **Engineer's Determination following Suspension**

Where, pursuant to Sub-Clause 40.1, this Sub-Clause applies the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount, which shall be added to the Contract Price, in respect of the cost

incurred by the Contractor by reason of such suspension,
and shall notify the Contractor accordingly, with a copy to the Employer.

40.3 **Suspension lasting more than 84 Days**

If the progress of the Works or any part thereof is suspended on the written instructions of the Engineer and if permission to resume work is not given by the Engineer within a period for 84 days from the date of suspension then, unless such suspension is within paragraph (a), (b), (c) or (d) of Sub-Clause 40.1, the Contractor may give notice to the Engineer requiring permission, within 28 days from the receipt thereof, to proceed with the Works or that part thereof in regard to which progress is suspended. If, within the said time, such permission is not granted, the Contractor may, but is not bound to, elect to treat the suspension, where it affects part only of the Works, as an omission of such part under Clause 51 by giving a further notice to the Engineer to that effect, or, where it affects the whole of the Works, treat the suspension as an event of default by the Employer and terminates his employment under the Contract in accordance with the provisions of Sub-Clause 69.1, whereupon the provisions of Sub-Clause 69.2 and 69.3 shall apply.

Commencement and Delays

41.1 **Commencement of Works**

The Contractor shall commence the Works as soon as is reasonably possible after the receipt by him of notice to this effect from the Engineer, which notice shall be issued within the time stated in the Appendix to Tender after the date of the Letter of Acceptance. Thereafter, the Contractor shall proceed with the Works with due expedition and without delay.

42.1 **Possession of Site and Access Thereto**

Save insofar as the Contract may prescribe:

- (a) the extent of portions of the Site of which the Contractor is to be given possession from time to time,
- (b) the order in which such portions shall be made available to the Contractor,

and, subject to any requirement in the Contract as to the order in which the Works shall be executed, the Employer will, with the Engineer's notice to commence the Works, give to the Contractor possession of

- (c) so much of the Site, and
- (d) such access as, in accordance with the Contract, is to be provided by the Employer as may be required to enable the Contractor to commence and proceed with the execution of the Works in accordance with the programme referred to in

Clause 14, if any, and otherwise in accordance with such reasonable proposals as the Contractor shall, by notice to the Engineer with a copy to the Employer, make. The Employer will, from time to time as the Works proceed, give to the Contractor possession of such further portions of the Site as may be required to enable the Contractor to proceed with the execution of the Works with due dispatch in accordance with such programme or proposals, as the case may be.

42.2 **Failure to Give Possession**

If the Contractor suffers delay and/or incurs costs from failure on the part of the Employer to give possession in accordance with the terms of Sub-Clause 42.1, the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price,

and shall notify the Contractor accordingly, with a copy to the Employer.

42.3 **Rights of Way and Facilities**

The Contractor shall bear all costs and charges for special or temporary wayleaves required by him in connection with access to the Site. The Contractor shall also provide at his own cost any additional facilities outside the Site required by him for the purposes of the Works.

43.1 **Time for Completion**

The whole of the Works and, if applicable, any Section required to be completed within a particular time as stated in the Appendix to Tender, shall be completed, in accordance with the provisions of Clause 48, within the time stated in the Appendix to Tender for the whole of the Works or the Section (as the case may be), calculated from the Commencement Date, or such extended time as may be allowed under Clause 44.

44.1 **Extension of Time for Completion**

In the event of:

- (a) the amount or nature of extra or additional work,
- (b) any cause of delay referred to in these Conditions,
- (c) exceptionally adverse climatic conditions,
- (d) any delay, impediment or prevention by the Employer, or
- (e) other special circumstances which may occur, other than through a default of or breach of contract by the Contractor or for which he is responsible,

being such as fairly to entitle the Contractor to an extension of the Time for

Completion of the Works, or any Section or part thereof, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of such extension and shall notify the Contractor accordingly, with a copy to the Employer.

44.2

Contractor to Provide Notification and Detailed Particulars

Provided that the Engineer is not bound to make any determination unless the Contractor has

- (a) within 28 days after such event has first arisen notified the Engineer with a copy to the Employer, and
- (b) within 28 days or such other reasonable time as may be agreed by the Engineer, after such notification submitted to the Engineer detailed particulars of any extension of time to which he may consider himself entitled in order that such submission may be investigated at the time.

44.3

Interim Determination of Extension

Provided also that where an event has a continuing effect such that it is not

practicable for the Contractor to submit detailed particulars within the period of 28 days referred to in Sub-Clause 44.2(b), he shall nevertheless be entitled to an extension of time provided that he has submitted to the Engineer interim particulars at intervals of not more than 28 days and final particulars within 28 days of the end of the effects resulting from the event. On receipt of such interim particulars, the Engineer shall, without undue delay, make an interim determination of extension of time and, on receipt of the final particulars, the Engineer shall review all the circumstances and shall determine an overall extension of time in regard to the event. In both such cases the Engineer shall make his determination after due consultation with the Employer and the Contractor and shall notify the Contractor of the determination, with a copy to the Employer. No final review shall result in a decrease of any extension of time already determined by the Engineer.

45.1

Restriction on Working Hours

Subject to any provision to the contrary contained in the Contract, none of the Works shall, save as hereinafter provided, be carried on during the night or on locally recognised days of rest without the consent of the Engineer, except when work is unavoidable or absolutely necessary for the saving of life or property or for the safety of the Works, in which case the Contractor shall immediately advise the Engineer. Provided that the provisions of this Clause shall not be applicable in the case of any work which it is customary to carry out by multiple shifts.

46.1

Rate of Progress

If for any reason, which does not entitle the Contractor to an extension of time, the rate of progress of the Works or any Section is at any time, in the opinion of the Engineer, too slow to comply with the Time for Completion, the Engineer shall so notify the Contractor who shall thereupon take such steps as are necessary, subject

to the consent of the Engineer, to expedite progress so as to comply with the Time for Completion. The Contractor shall not be entitled to any additional payment for taking such steps. If, as a result of any notice given by the Engineer under this Clause, the Contractor considers that it is necessary to do any work at night or on locally recognised days of rest, he shall be entitled to seek the consent of the Engineer so to do. Provided that if any steps, taken by the Contractor in meeting his obligations under this Clause, involve the Employer in additional supervision costs, such cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

47.1 **Liquidated Damages for Delay**

If the Contractor fails to comply with the Time for Completion in accordance with Clause 48, for the whole of the Works or, if applicable, any Section within the relevant time prescribed by Clause 43, then the Contractor shall pay to the Employer the relevant sum stated in the Appendix to Tender as liquidated damages for such default and not as a penalty (which sum shall be the only monies due from the Contractor for such default) for every day or part of a day which shall elapse between the relevant Time for Completion and the date stated in a Taking-Over Certificate of the whole of the Works or the relevant Section, subject to the applicable limit stated in the Appendix to Tender. The Employer may, without prejudice to any other method of recovery, deduct the amount of such damages from any monies due or to become due to the Contractor. The payment or deduction of such damages shall not relieve the Contractor from his obligation to complete the Works, or from any other of his obligations and liabilities under the Contract.

47.2 **Reduction of Liquidated Damages**

If, before the Time for Completion of the whole of the Works or, if applicable, any Section, a Taking-Over Certificate has been issued for any part of the Works or of a Section, the liquidated damages for delay in completion of the remainder of the Works or of that Section shall, for any period of delay after the date stated in such Taking-Over Certificate, and in the absence of Alternative provisions in the Contract, be reduced in the proportion which the value of the part so certified bears to the value of the whole of the Works or Section, as applicable. The provisions of this Sub-Clause shall only apply to the rate of liquidated damages and shall not affect the limit thereof.

48.1 **Taking-Over Certificate**

When the whole of the Works have been substantially completed and have satisfactorily passed any Tests on Completion prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer with a copy to the Employer, accompanied by a written undertaking to finish with due expedition any outstanding work during the Defects Liability Period. Such notice and undertaking shall be deemed to be a request by the Contractor for the Engineer to issue a Taking-Over Certificate in respect of the Works. The Engineer shall within 21 days of the date of delivery of such notice, either issue to the Contractor, with a copy to the

Employer, a Taking-Over Certificate, stating the date on which, in his opinion, the Works were substantially completed in accordance with the Contract, or give instructions in writing to the Contractor specifying all the work which, in the Engineer's opinion, is required to be done by the Contractor before the issue of such Certificate. The Engineer shall also notify the Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such Taking-Over Certificate within 21 days of completion, to the satisfaction of the Engineer, of the Works so specified and remedying any defects so notified.

48.2 **Taking Over of Sections or Parts**

Similarly, in accordance with the procedure set out in Sub-Clause 48.1, the Contractor may request and the Engineer shall issue a Taking-Over Certificate in respect of:

- (a) any Section in respect of which a separate Time for Completion is provided in the Appendix to Tender,
- (b) any substantial part of the Permanent Works which has been both completed to the satisfaction of the Engineer and, otherwise than as provided for in the Contract, occupied or used by the Employer, or
- (c) any part of the Permanent Works which the Employer has elected to occupy or use prior to completion (where such prior occupation or use is not provided for in the Contract or has not been agreed by the Contractor as a temporary measure).

48.3 **Substantial Completion of Parts**

If any part of the Permanent Works has been substantially completed and has satisfactorily passed any Tests on Completion prescribed by the Contractor, the Engineer may issue a Taking-Over Certificate in respect of that part of the Permanent Works before completion of the whole of the Works and, upon the issue of such Certificate, the Contractor shall be deemed to have undertaken to complete with due expedition any outstanding work in that part of the Permanent Works during the Defects Liability Period.

48.4 **Surfaces Requiring Reinstatement**

Provided that a Taking-Over Certificate given in respect of any Section or part of the Permanent Works before completion of the whole of the Works shall not be deemed to certify completion of any ground or surfaces requiring reinstatement, unless such Taking-Over Certificate shall expressly so state.

Defects Liability

49.1 **Defects Liability Period**

In these Conditions the expression "Defects Liability Period" shall mean the defects liability period named in the Appendix to Tender, calculated from:

- (a) the date of completion of the Works certified by the Engineer in accordance

with Clause 48, or

(b) in the event of more than one certificate having issued by the Engineer under Clause 48, the respective dates so certified, and in relation to the Defects Liability Period the expression "the Works" shall be construed accordingly.

49.2

Completion of Outstanding Work and Remedyng Defects

To the intent that the Works shall, at or as soon as practicable after the expiration of the Defects Liability Period, be delivered to the Employer in the condition required by the Contract, fair wear and tear excepted, to the satisfaction of the Engineer, the Contractor shall:

- (a) complete the work, if any, outstanding on the date stated in the Taking-Over Certificate as soon as practicable after such date, and
- (b) execute all such work of amendment, reconstruction, and remedying defects, shrinkages or other faults as the Engineer may, during the Defects Liability Period or within 14 days after its expiration, as a result of an inspection made by or on behalf of the Engineer prior to its expiration, instruct the Contractor to execute.

49.3

Cost of Remedyng Defects

All work referred to in Sub-Clause 49.2(b) shall be executed by the Contractor at his own cost if the necessity thereof is, in the opinion of the Engineer, due to:

- (a) the use of materials, Plant or workmanship not in accordance with the Contract,
- (b) where the Contractor is responsible for the design of part of the Permanent Works, any fault in such design, or
- (c) the neglect or failure on the part of the Contractor to comply with any obligation, expressed or implied, on the Contractor's part under the Contract.

If, in the opinion of the Engineer, such necessity is due to any other cause, he shall determine an addition to the Contract Price in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.

49.4

Contractor's Failure to Carry Out Instructions

In case of default on the part of the Contractor in carrying out such instruction within a reasonable time, the Employer shall be entitled to employ and pay other persons to carry out the same and if such work is work which, in the opinion of the Engineer, the Contractor was liable to do at his own cost under the Contract, then all cost consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

50.1

Contractor to Search

If any defect, shrinkage or other fault in the Works appears at any time prior to the end of the Defects Liability Period, the Engineer may instruct the Contractor, with a

copy to the Employer, to search under the directions of the Engineer for the cause thereof. Unless such defect, shrinkage or other fault is one for which the Contractor is liable under the Contract, the Engineer shall, after due consultation with the Employer and the Contractor, determine the amount in respect of the costs of such search incurred by the Contractor, which shall be added to the Contract Price and shall notify the Contractor accordingly, with a copy to the Employer. If such defect, shrinkage or other fault is one for which the Contractor is liable, the cost of the work carried out in searching as aforesaid shall be borne by the Contractor and he shall in such case remedy such defect, shrinkage or other fault at his own cost in accordance with the provisions of Clause 49.

Alterations, Additions and Omissions

51.1 Variations

The Engineer shall make any variation of the form, qualify or quantity of the Works or any part thereof that may, in his opinion, be necessary and for that purpose, or if for any other reason it shall, in his opinion, be appropriate, he shall have the authority to instruct the Contractor to do and the Contractor shall do any of the following:

- (a) increase or decrease the quantity of any work included in the Contract,
- (b) omit any such work (but not if the omitted work is to be carried out by the Employer or by another contractor),
- (c) change the character or quality or kind of any such work,
- (d) change the levels, lines, position and dimensions of any part of the Works,
- (e) execute additional work of any kind necessary for the completion of the Works, or
- (f) change any specified sequence or timing of construction of any part of the Works.

No such variation shall in any way vitiate or invalidate the Contract, but the effect, if any, of all such variations shall be valued in accordance with Clause 52. Provided that where the issue of an instruction to vary the Works is necessitated by some default of or breach of contract by the Contractor or for which he is responsible, any additional cost attributable to such default shall be borne by the Contractor.

51.2 Instructions for Variations

The Contractor shall not make any such variation without an instruction of the Engineer. Provided that no instruction shall be required for increase or decrease in the quantity of any work where such increase or decrease is not the result of an instruction given under this Clause, but is the result of the quantities exceeding or being less than those stated in the Bill of Quantities.

52.1 Valuation of Variations

All variations referred to in Clause 51 and any additions to the Contract Price which are required to be determined in accordance with Clause 52 (for the purposes of this Clause referred to as "varied work"), shall be valued at the rates and prices set out in the Contract if, in the opinion of the Engineer, the same shall be applicable. If the Contract does not contain any rates or prices applicable to the varied work, the rates

and prices in the Contract shall be used as the basis for valuation so far as may be reasonable, failing which, after due consultation by the Engineer with the Employer and the Contractor, suitable rates or prices shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such rates or prices as are, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60.

52.2 **Power of Engineer to Fix Rates**

Provided that if the nature or amount of any varied work relative to the nature or amount of the whole of the Works or to any part thereof, is such that, in the opinion of the Engineer, the rate or price contained in the Contract for any item of the Works is, by reason of such varied work, rendered inappropriate or inapplicable, then, after due consultation by the Engineer with the Employer and the Contractor, a suitable rate or price shall be agreed upon between the Engineer and the Contractor. In the event of disagreement the Engineer shall fix such other rate or price as is, in his opinion, appropriate and shall notify the Contractor accordingly, with a copy to the Employer. Until such time as rates or prices are agreed or fixed, the Engineer shall determine provisional rates or prices to enable on-account payments to be included in certificates issued in accordance with Clause 60.

Provided also that no varied work instructed to be done by the Engineer pursuant to Clause 51 shall be valued under Sub-Clause 52.1 or under this Sub-Clause unless, within 14 days of the date of such instruction and, other than in the case of omitted work, before the commencement of the varied work, notice shall have been given either:

- (a) by the Contractor to the Engineer of his intention to claim extra payment or a varied rate or price, or
- (b) by the Engineer to the Contractor of his intention to vary a rate or price.

52.3 **Variations Exceeding 15 per cent**

If, on the issue of the Taking-Over Certificate for the whole of the Works, it is found that as a result of:

- (a) all varied work valued under Sub-Clauses 52.1 and 52.2, and
- (b) all adjustments upon measurement of the estimated quantities set out in the Bill of Quantities, excluding Provisional Sums, dayworks and adjustment of price made under Clause 70.

but not from any other cause, there have been additions to or deductions from the Contract Price which taken together are in excess of 15 per cent of the "Effective Contract Price" (which for the purposes of this Sub-Clause shall mean the Contract Price, excluding Provisional Sums and allowance for dayworks, if any) then and in such event (subject to any action already taken under any other Sub-Clause of this Clause), after due consultation by the Engineer with the Employer and the

Contractor, there shall be added to or deducted from the Contract Price such further sums as may be agreed between the Contractor and the Engineer or, failing agreement, determined by the Engineer having regard to the Contractor's Site and general overhead costs of the Contract. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer. Such sum shall be based only on the amount by which such additions or deductions shall be in excess of 15 per cent of the Effective Contract Price.

52.4 **Daywork**

The Engineer may, if in his opinion it is necessary or desirable, issue an instruction that any varied work shall be executed on a daywork basis. The Contractor shall then be paid for such varied work under the terms set out in the daywork schedule included in the Contract and at the rates and prices affixed thereto by him in the Tender.

The Contractor shall furnish to the Engineer such receipts or other vouchers as may be necessary to provide the amounts paid and, before ordering material, shall submit to the Engineer quotations for the same for his approval.

In respect of such of the Works executed on a daywork basis, the Contractor shall during the continuance of such work, deliver each day to the Engineer an exact list in duplicate of the names, occupation and time of all workmen employed on such work and a statement, also in duplicate, showing the description and quantity of all materials and Contractor's Equipment used thereon or therefor other than Contractor's Equipment which is included in the percentage addition in accordance with such daywork schedule. One copy of each list and statement will, if correct, or when agreed, be signed by the Engineer and returned to the Contractor.

At the end of each month the Contractor shall deliver to the Engineer a priced statement of the labour, materials and Contractor's Equipment, except as aforesaid, used and the Contractor shall not be entitled to any payment unless such lists and statements have been fully and punctually rendered. Provided always that if the Engineer considers that for any reason the sending of such lists or statements by the Contractor, in accordance with the foregoing provision, was impracticable he shall nevertheless be entitled to authorise payment for such work, either as daywork, on being satisfied as to the time employed and the labour, materials and Contractor's Equipment used on such work, or at such value therefor as shall, in his opinion, be fair and reasonable.

Procedure for Claims

53.1 **Notice of Claims**

Notwithstanding any other provision of the Contract, if the Contractor intends to claim any additional payment pursuant to any Clause of these Conditions or otherwise, he shall give notice of his intention to the Engineer with a copy to the

Employer, within 28 days after the event giving rise to the claim has first arisen.

53.2 Contemporary Records

Upon the happening of the event referred to in Sub-Clause 53.1, the Contractor shall keep such contemporary records as may reasonably be necessary to support any claim he may subsequently wish to make. Without necessarily admitting the Employer's liability, the Engineer shall, on receipt of a notice under Sub-Clause 53.1, inspect such contemporary records and may instruct the Contractor to keep any further contemporary records as are reasonable and may be material to the claim of which notice has been given. The Contractor shall permit the Engineer to inspect all records kept pursuant to this Sub-Clause and shall supply him with copies thereof as and when the Engineer so instructs.

53.3 Substantiation of Claims

Within 28 days, or such other reasonable time as may be agreed by the Engineer, of giving notice under Sub-Clause 53.1, the Contractor shall send to the Engineer an account giving detailed particulars of the amount claimed and the grounds upon which the claim is based. Where the event giving rise to the claim has a continuing effect, such account shall be considered to be an interim account and the Contractor shall, at such intervals as the Engineer may reasonably require, send further interim accounts giving the accumulated amount of the claim and any further grounds upon which it is based. In cases where interim accounts are sent to the Engineer, the Contractor shall send a final account within 28 days of the end of the effects resulting from the event. The Contractor shall, if required by the Engineer so to do, copy to the Employer all accounts sent to the Engineer pursuant to this Sub-Clause.

53.4 Failure to Comply

If the Contractor fails to comply with any of the provisions of this Clause in respect of any claim which he seeks to make, his entitlement to payment in respect thereof shall not exceed such amount as the Engineer or any arbitrator or arbitrators appointed pursuant to Sub-Clause 67.3 assessing the claim considers to be verified by contemporary records (whether or not such records were brought to the Engineer's notice as required under Sub-Clause 53.2 and 53.3).

53.5 Payment of Claims

The Contractor shall be entitled to have included in any interim payment certified by the Engineer pursuant to Clause 60 such amount in respect of any claim as the Engineer, after due consultation with the Employer and the Contractor, may consider due to the Contractor provided that the Contractor has supplied sufficient particulars to enable the Engineer to determine the amount due. If such particulars are insufficient to substantiate the whole of the claim, the Contractor shall be entitled to payment in respect of such part of the claim as such particulars may substantiate to the satisfaction of the Engineer. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer.

Contractor's Equipment, Temporary Works and Materials

54.1 Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works

All Contractor's Equipment, Temporary Works and materials provided by the Contractor shall, when brought on to the Site, be deemed to be exclusively intended for the execution of the Works and the Contractor shall not remove the same or any part thereof, except for the purpose of moving it from one part of the Site to another, without the consent of the Engineer. Provided that consent shall not be required for vehicles engaged in transporting any staff, labour, Contractor's Equipment, Temporary Works, Plant or materials to or from the Site.

54.2 Employer not Liable for Damage

The Employer shall not at any time be liable, save as mentioned in Clauses 20 and 65, for the loss of or damage to any of the said Contractor's Equipment, Temporary Works or materials.

54.3 Customs Clearance

The Employer will use his best endeavours in assisting the Contractor, where required, in obtaining clearance through the Customs of Contractor's Equipment, materials and other things required for the Works.

54.4 Re-export of Contractor's Equipment

In respect of any Contractor's Equipment which the Contractor has imported for the purposes of the Works, the Employer will use his best endeavours to assist the Contractor, where required, in procuring any necessary Government consent to the re-export of such Contractor's Equipment by the Contractor upon the removal thereof pursuant to the terms of Contract.

54.5 Conditions of Hire of Contractor's Equipment

With a view to securing, in the event of termination under Clause 63, the continued availability, for the purpose of executing the Works, of any hired Contractor's Equipment, the Contractor shall not bring on to the Site any hired Contractor's Equipment unless there is an agreement for hire thereof (which agreement shall be deemed not to include an agreement for hire purchase) which contains a provision that the owner thereof will, on request in writing made by the Employer within 7 days after the date on which any termination has become effective, and on the Employer undertaking to pay all hire charges in respect thereof from such date, hire such Contractor's Equipment to the Employer on the same terms in all respect as the same was hired to the Contractor save that the Employer shall be entitled to permit the use thereof by any other contractor employed by him for the purpose of execution and completing the Works and remedying any defects therein, under the terms of the said Clause 63.

54.6 Costs for the Purpose of Clause 63

In the event of the Employer entering into any agreement for the hire of Contractor's Equipment pursuant to Sub-Clause 54.5, all sums properly paid by the

Employer under the provision of any such agreement and all costs incurred by him (including stamp duties) in entering into such agreement shall be deemed, for the purpose of Clause 63, to be part of the cost of executing and completing the Works and the remedying of any defects therein.

54.7 Incorporation of Clause in Subcontracts

The Contractor shall, where entering into any subcontract for the execution of any part of the Works, incorporate in such subcontract (by reference or otherwise) the provisions of this Clause in relation to Contractor's Equipment, Temporary Works or materials brought on to the Site by the Subcontractor.

54.8 Approval of Materials not Implied

The operation of this Clause shall not be deemed to imply any approval by the Engineer of the materials or other matters referred to therein nor shall it prevent the rejection of any such materials at any time by the Engineer.

Measurement

55.1 Quantities

The quantities set out in the Bill of Quantities are the estimated quantities for the Works, and they are not to be taken as the actual and correct quantities of the Works to be executed by the Contractor in fulfillment of his obligations under the Contract.

56.1 Works to be Measured

The Engineer shall, except as otherwise stated, ascertain and determine by measurement the value of the Works in accordance with the Contract and the Contractor shall be paid that value in accordance with Clause 60. The Engineer shall, when he requires any part of the Works to be measured, give reasonable notice to the Contractor's authorised agent, who shall:

- (a) forthwith attend or send a qualified representative to assist the Engineer in making such measurement, and
- (b) supply all particulars required by the Engineer.

Should the Contractor not attend, or neglect or omit to send such representative, then the measurement made by the Engineer or approved by him shall be taken to be the correct measurement of such part of the Works. For the purpose of measuring such Permanent Works as are to be measured by records and drawings, the Engineer shall prepare records and drawings as the work proceeds and the Contractor, as and when called upon to do so in writing, shall, within 14 days, attend to examine and agree such records and drawings with the Engineer and shall sign the same when so agreed. If the Contractor does not attend to examine and agree such records and drawings, they shall be taken to be correct. If, after examination of such records and drawings, the Contractor does not agree the same or does not sign the same as agreed, they shall nevertheless be taken to be correct,

unless the Contractor, within 14 days of such examination, lodges with the Engineer notice of the respects in which such records and drawings are claimed by him to be incorrect. On receipt of such notice, the Engineer shall review the records and drawings and either confirm or vary them.

57.1 **Method of Measurement**

The Works shall be measured net, notwithstanding any general or local custom, except where otherwise provided for in the Contract.

57.2 **Breakdown of Lump Sum Items**

For the purposes of statements submitted in accordance with Sub-Clause 60.1, the Contractor shall submit to the Engineer, within 28 days after the receipt of the Letter of Acceptance, a breakdown for each of the lump sum items contained in the Tender. Such breakdowns shall be subject to the approval of the Engineer.

Provisional Sums

58.1 **Definition of "Provisional Sum"**

"Provisional Sum" means a sum included in the Contract and so designated in the Bill of Quantities for the execution of any part of the Works or for the supply of goods, materials, Plant or services, or for contingencies, which sum may be used, in whole or in part, or not at all, on the instructions of the Engineer. The Contractor shall be entitled to only such amounts in respect of the work, supply or contingencies to which such Provisional Sums relate as the Engineer shall determine in accordance with this Clause. The Engineer shall notify the Contractor of any determination made under this Sub-Clause, with a copy to the Employer.

58.2 **Use of Provisional Sums**

In respect of every Provisional Sum the Engineer shall have authority to issue instructions for the execution of work or for the supply of goods, material, Plant or services by:

- (a) the Contractor, in which case the Contractor shall be entitled to an amount equal to the value thereof determined in accordance with Clause 52, and
- (b) a nominated Subcontractor, as hereinafter defined, in which case the sum to be paid to the Contractor therefor shall be determined and paid in accordance with Sub-Clause 59.4.

58.3 **Production of Vouchers**

The Contractor shall produce to the Engineer all quotations, invoices, vouchers and accounts or receipts in connection with expenditure in respect of Provisional Sums, except where work is valued in accordance with rates or prices set out in the Tender.

Nominated Subcontractors

59.1 Definition of "Nominated Subcontractors"

All specialists, merchants, tradesmen and others executing any work or supplying any goods, materials, Plant or services for which Provisional Sums are included in the Contract, who may have been or be nominated or selected or approved by the Employer or the Engineer, and all persons to whom by virtue of the provisions of the Contract the Contractor is required to subcontract shall, in the execution of such work or the supply of such goods, materials, Plant or services, be deemed to be subcontractors to the Contractor and are referred to in this Contract as "nominated Subcontractors".

59.2 Nominated Subcontractors; Objection to Nomination

The Contractor shall not be required by the Employer or the Engineer, or be deemed to be under any obligation, to employ any nominated Subcontractor against whom the Contractor may raise reasonable objection, or who declines to enter into subcontract with the Contractor containing provisions:

(a) that in respect of the work, goods, materials, Plant or services the subject of the subcontract, the nominated Subcontractor will undertake towards the Contractor such obligations and liabilities as will enable the Contractor to discharge his own obligations and liabilities towards the Employer under the terms of the Contract and will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection therewith, or arising out of or in connection with any failure to perform such obligations or to fulfill such liabilities, and

(b) that the nominated Subcontractor will save harmless and indemnify the Contractor from and against any negligence by the nominated Subcontractor, his agents, workmen and servants and from and against any misuse by him or them of any Temporary Works provided by the Contractor for the purposes of the Contract and from all claims as aforesaid.

59.3 Design Requirements to be Expressly Stated

If in connection with any Provisional Sum the services to be provided include any matter of design or specification of any part of the Permanent Works or of any Plant to be incorporated therein, such requirement shall be expressly stated in the Contract and shall be included in any nominated Subcontract. The nominated Subcontract shall specify that the nominated Subcontractor providing such services will save harmless and indemnify the Contractor from and against the same and from all claims, proceedings, damages, costs, charges and expenses whatsoever arising out of or in connection with any failure to perform such obligations or to fulfill such liabilities.

59.4 Payments to Nominated Subcontractors

For all work executed or goods, materials, Plant or services supplied by any

nominated Subcontractor, the Contractor shall be entitled to:

(a) the actual price paid or due to be paid by the Contractor, on the instructions of the Engineer, and in accordance with the subcontract;

(b) in respect of labour supplied by the Contractor, the sum, if any,

entered in the Bill of Quantities or, if instructed by the Engineer pursuant to paragraph (a) of Sub-Clause 58.2, as may be determined in accordance with Clause 52; and

(c) in respect of all other charges and profit, a sum being a percentage rate of the actual price paid or due to be paid calculated, where provision has been made in the Bill of Quantities for a rate to be set against the relevant Provisional Sum, at the rate inserted by the Contractor against that item or, where no such provision has been made, at the rate inserted by the Contractor in the Appendix to Tender and repeated where provision for such is made in a special item provided in the Bill of Quantities for such purpose.

59.5

Certification of Payments to Nominated Subcontractors

Before issuing, under Clause 60 any certificate, which includes any payment in respect of work done or goods, materials, Plant or services supplied by any nominated Subcontractor, the Engineer shall be entitled to demand from the Contractor reasonable proof that all payments, less retentions, included in previous certificates in respect of the work or goods, materials, Plant or services of such nominated Subcontractor have been paid or discharged by the Contractor. If the Contractor fails to supply such proof then, unless the Contractor:

(a) satisfies the Engineer in writing that he has reasonable cause for withholding or refusing to make such payment, and

(b) produces to the Engineer reasonable proof that he has so informed such nominated Subcontractor in writing,

the Employer shall be entitled to pay to such nominated Subcontractor direct, upon the certificate of the Engineer, all payments, less retention, provided for in the nominated Subcontract, which the Contractor has failed to make to such nominated Subcontractor and to deduct by way of set-off the amount so paid by the Employer from any sums due or to become due from the Employer to the Contractor.

Provided that, where the Engineer has certified and the Employer has paid direct as aforesaid, the Engineer shall in issuing any further certificate in favour of the Contractor, deduct from the amount thereof the amount so paid, direct as aforesaid, but shall not withhold or delay the issue of the certificate itself when due to be issued under the terms of the Contract.

Certificates and Payment

60.1

Monthly Statements

The Contractor shall submit to the Engineer after the end of each month six copies, each signed by the Contractor's representative approved by the Engineer in accordance with the Sub-Clause 15.1, of a statement, in such form

as the Engineer may from time to time prescribe, showing the amounts to which the Contractor considers himself to be entitled up to the end of the month in respect of:

- (a) the value of the Permanent Works executed,
- (b) any other items in the Bill of Quantities including those for Contractor's Equipment, Temporary Works, dayworks and the like,
- (c) the percentage of the invoice value of listed materials, all as stated in the Appendix to Tender, and Plant delivered by the Contractor on the Site for incorporation in the Permanent Works but not incorporated in such Works,
- (d) adjustments under Clause 70, and
- (e) any other sum to which the Contractor may be entitled under the Contract or otherwise.

60.2 **Monthly Payments**

The Engineer shall, within 28 days of receiving such statement, certify to the Employer the amount of payment to the Contractor which he considers due and payable in respect thereof, subject:

- (a) firstly, to the retention of the account calculated by applying the Percentage of Retention stated in the Appendix to Tender, to the amount to which the Contractor is entitled under paragraph (a), (b), (c) and (e) of Sub-Clause 60.1 until the amount so retained reaches the Limit of Retention Money stated in the Appendix to Tender, and
- (b) secondly, to the deduction, other than pursuant to Clause 47, of any sums which may have become due and payable by the Contractor to the Employer.

Provided that the Engineer shall not be bound to certify any payment under this Sub-Clause if the net amount thereof, after all retentions and deductions, would be less than the Minimum Amount of Interim Payment Certificates stated in the Appendix to Tender.

Notwithstanding the terms of this Clause or any other Clause of the Contract no amount will be certified by the Engineer for payment until the performance security, if required under the Contract, has been provided by the Contractor and approved by the Employer.

60.3 **Payment of Retention Money**

- (a) Upon the issue of the Taking-Over Certificate with respect to the whole of the Works, one half of the Retention Money, or upon the issue of a Taking-Over Certificate with respect to a Section or part of the Permanent

Works only such proportion thereof as the Engineer determines having regard to the relative value of such Section or part of the Permanent Works, shall be certified by the Engineer for payment to the Contractor.

(b) Upon the expiration of the Defects Liability Period for the Works the other half of the Retention Money shall be certified by the Engineer for payment to the Contractor. Provided that, in the event of different Defects Liability Periods having become applicable to different Sections or part of the Permanent Works pursuant to Clause 48, the expression "expiration of the Defects Liability Period" shall, for the purposes of this Sub-Clause, be deemed to mean the expiration of the latest of such periods. Provided also that if at such time, there shall remain to be executed by the Contractor any work instructed, pursuant to Clause 49 and 50, in respect of the Works, the Engineer shall be entitled to withhold certification until completion of such work of so much of the balance of the Retention Money as shall, in the opinion of the Engineer, represent the cost of the work remaining to be executed.

60.4 **Correction of Certificates**

The Engineer may by any Interim Payment Certificate make any correction or modification in any previous certificate which shall have been issued by him and shall have authority, if any work is not being carried out to his satisfaction, to omit or reduce the value of such work in any Interim Payment Certificate.

60.5 **Statement at Completion**

Not later than 84 days after the issue of the Taking-Over Certificate in respect of the whole of the Works, the Contractor shall submit to the Engineer a Statement at Completion with supporting documents showing in detail, in the form approved by the Engineer:

- (a) the final value of all work done in accordance with the Contract up to the date stated in such Taking-Over Certificate,
- (b) any further sums which the Contractor considers to be due, and
- (c) an estimate of amounts which the Contractor considers will become due to him under the Contract.

The estimated amounts shall be shown separately in such Statement at Completion. The Engineer shall verify payment in accordance with Sub-Clause 60.2.

60.6 **Final Statement**

Not later than 56 days after the issue of the Defects Liability Certificate pursuant to Sub-Clause 62.1, the Contractor shall submit to the Engineer for consideration a draft final statement with supporting documents showing in detail, in the form approved by the Engineer:

- (a) the value of all work done in accordance with the Contract, and

(b) any further sums which the Contractor considers to be due to him under the Contract.

If the Engineer disagrees with or cannot verify any part of the draft final statement, the Contractor shall submit such further information as the Engineer may reasonably require and shall make such changes in the draft as may be agreed between them. The Contractor shall then prepare and submit to the Engineer the final statement as agreed (for the purposes of these Conditions referred to as the "Final Statement").

If, following discussions between the Engineer and the Contractor and any changes to the draft final statement which may be agreed between them, it becomes evident that a dispute exists, the Engineer shall deliver to the Employer an Interim Payment Certificate for those parts of the draft final statement, if any, which are not in dispute. The dispute may then be settled in accordance with Clause 67.

60.7

Discharge

Upon submission of the Final Statement, the Contractor shall give to the Employer, with a copy to the Engineer, a written discharge confirming that the total of the Final Statement represents full and final settlement of all monies due to the Contractor arising out of or in respect of the Contract. Provided that such discharge shall become effective only after payment due under the Final Payment Certificate issued pursuant to Sub-Clause 60.8 has been made and the performance security referred to in Sub-Clause 10.1, if any, has been returned to the Contractor.

60.8

Final Payment Certificate

Within 28 days after receipt of the Final Statement, and the written discharge, the Engineer shall issue to the Employer (with a copy to the Contractor) a Final Payment Certificate stating:

- (a) the amount which, in the opinion of the Engineer, is finally due under the Contract or otherwise, and
- (b) after giving credit to the Employer for all amounts previously paid by the Employer and for all sums to which the Employer is entitled other than under Clause 47, the balance, if any, due from the Employer to the Contractor or from the Contractor to the Employer as the case may be.

60.9

Cessation of Employer's Liability

The Employer shall not be liable to the Contractor for any matter or thing arising out of or in connection with the Contract or execution of the Works, unless the Contractor shall have included a claim in respect thereof in his Final Statement and (except in respect of matters or things arising after the issue of the Taking-Over Certificate in respect of the whole of the Works) in the Statement at Completion referred to in Sub-Clause 60.5.

60.10

Time for Payment

The amount due to the Contractor under any Interim Payment Certificate issued by the Engineer pursuant to this Clause, or to any other term of the Contract, shall,

subject to Clause 47, be paid by the Employer to the Contractor within 28 days after such Interim Payment Certificate has been delivered to the Employer, or, in the case of the Final Payment Certificate referred to in Sub-Clause 60.8, within 56 days, after such Final Payment Certificate has been delivered to the Employer. In the event of the failure of the Employer to make payment within the times stated, the Employer shall pay to the Contractor interest at the rate stated in the Appendix to Tender 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 or otherwise.

61.1 Approval only by Defects Liability Certificate

Only the Defects Liability Certificate, referred to in Clause 62, shall be deemed to constitute approval of the Works.

62.1 Defects Liability Certificate

The Contract shall not be considered as completed until a Defects Liability Certificate shall have been signed by the Engineer and delivered to the Employer, with a copy to the Contractor, stating the date on which the Contractor shall have completed his obligations to execute and complete the Works and remedy any defects therein to the Engineer's satisfaction. The Defects Liability Certificate shall be given by the Engineer within 28 days after the expiration of the Defects Liability Period, or, if different defects liability periods shall become applicable to different Sections or parts of the Permanent Works, the expiration of the latest such period, or as soon thereafter as any works instructed, pursuant to Clause 49 and 50, have been completed to the satisfaction of the Engineer. Provided that the issue of the Defects Liability Certificate shall not be a condition precedent to payment to the Contractor of the second portion of the Retention Money in accordance with the conditions set out in Sub-Clause 60.3.

62.2 Unfulfilled Obligations

Notwithstanding the issue of the Defects Liability Certificate the Contractor and the Employer shall remain liable for the fulfillment of any obligation incurred under the provisions of the Contract prior to the issue of the Defects Liability Certificate which remains unperformed at the time of such Defects Liability Certificate is issued and, for the purposes of determining the nature and extent of any such obligation, the Contract shall be deemed to remain in force between the parties to the Contract.

Remedies

63.1 Default of Contractor

If the Contractor is deemed by law unable to pay his debts as they fall due, or enters into voluntary or involuntary bankruptcy, liquidation or dissolution (other than a voluntary liquidation for the purposes of amalgamation or reconstruction), or becomes insolvent, or makes an arrangement with, or assignment in favour of, his creditors, or agrees to carry out the Contract under a committee of inspection of his creditors, or if a receiver, administrator, trustee or liquidator is appointed over

any substantial part of his assets, or if, under any law or regulation relating to reorganization, arrangement or readjustment of debts, proceedings are commenced against the Contractor or resolutions passed in connection with dissolution or liquidation or if any steps are taken to enforce any security interest over a substantial part of the assets of the Contractor, or if any act is done or event occurs with respect to the Contractor or his assets which, under any applicable law has a substantially similar effect to any of the foregoing acts or events, or if the Contractor has contravened Sub-Clause 3.1, or has an execution levied on his goods, or Contract, if the Engineer certifies to the Employer, with a copy to the Contractor, that, in his opinion, the Contractor:

- (a) has repudiated the Contract, or
- (b) without reasonable excuse has failed
 - (i) to commence the Works in accordance with Sub-Clause 41.1,
 - (ii) to proceed with the Works, or any Section thereof, within 28 days after receiving notice pursuant to Sub-Clause 46.1,
- (c) has failed to comply with a notice issued pursuant to Sub-Clause 37.4 or an instruction issued pursuant to Sub-Clause 39.1 within 28 days after having received it
- (d) despite previous warning from the Engineer, in writing, is otherwise persistently or flagrantly neglecting to comply with any of his obligations under the Contract, or
- (e) has contravened Sub-Clause 4.1,
then the Employer may, after giving 14 days' notice to the Contractor, enter upon the Site and the Works and terminate the employment of the Contractor without thereby releasing the Contractor from any of his obligations or liabilities under the Contract, or affecting the rights and authorities conferred on the Employer or the Engineer by the Contract, and may himself complete the Works or may employ any other contractor to complete the Works. The Employer or such other contractor may use for such completion so much of the Contractor's Equipment, Temporary Works and materials as he or they may think proper.

63.2

Valuation at Date of Termination

The Engineer shall, as soon as may be practicable after any such entry and termination by the Employer, fix and determine ex parte, or by or after reference to the parties or after such investigation or enquiries as he may think fit to make or institute, and shall certify:

- (a) what amount (if any) had, at the time of such entry and termination, been reasonably earned by or would reasonably accrue to the Contractor in respect of work then actually done by him under the Contract, and
- (b) the value of any of the said unused or partially used materials, any Contractor's Equipment and any Temporary Works.

63.3 Payment after Termination

If the Employer terminates the Contractor's employment under this Clause, he shall not be liable to pay to the Contractor any further amount (including damages) in respect of the Contract until the expiration of the Defects Liability Period and thereafter until the costs of execution, completion and remedying of any defects, damages for delay in completion (if any) and all other expenses incurred by the Employer have been ascertained and the amount thereof certified by the Engineer. The Contractor shall then be entitled to receive only such sum (if any) as the Engineer may certify would have been payable to him upon due completion by him after deducting the said amount. If such amount exceeds the sum which would have been payable to the Contractor on due completion by him, then the Contractor shall, upon demand, pay to the Employer the amount of such excess and it shall be deemed a debt due by the Contractor to the Employer and shall be recoverable accordingly.

63.4 Assignment of Benefit of Agreement

Unless prohibited by law, the Contractor shall, if so instructed by the Engineer within 14 days of such entry and termination referred to in Sub-Clause 63.1, assign to the Employer the benefit of any agreement for the supply of any goods or materials or services and/or for the execution of any work for the purposes of the Contract, which the Contractor may have entered into.

64.1 Urgent Remedial Work

If, by reason of any accident, or failure, or other event occurring to, in, or in connection with the Works, or any part thereof, either during the execution of the Works, or during the Defects Liability Period, any remedial or other work is, in the opinion of the Engineer, urgently necessary for the safety of the Works and the Contractor is unable or unwilling at once to do such work, the Employer shall be entitled to employ and pay other persons to carry out such work as the Engineer may consider necessary. If the work or repair so done by the Employer is work which, in the opinion of the Engineer, the Contractor was liable to do at his own cost under the Contract, then all costs consequent thereon or incidental thereto shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be recoverable from the Contractor by the Employer, and may be deducted by the Employer from any monies due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly, with a copy to the Employer. Provided that the Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof.

Special Risks

65.1

No Liability for Special Risks

The Contractor shall be under no liability whatsoever in consequence of any of the special risks referred to in Sub-Clause 65.2, whether by way of indemnity or otherwise, for or in respect of:

- (a) destruction of or damage to the Works, save to work condemned under the provisions of Clause 39 prior to the occurrence of any of the said special risks,
- (b) destruction of or damage to property, whether of the Employer or third parties, or
- (c) injury or loss of life.

65.2

Special Risks

The Special Risks are:

- (a) the risks defined under paragraphs (a), (c), (d) and (e) of Sub-Clause 20.4, and
- (b) the risks defined under paragraph (b) of Sub-Clause 20.4 insofar as these relate to the country in which the Works are to be executed.

65.3

Damage to Works by Special Risks

If the Works or any materials or Plant on or near or in transit to the Site, or any of the Contractor's Equipment, sustain destruction or damage by reason of any of the said special risks, the Contractor shall be entitled to payment in accordance with the Contract for any Permanent Works duly executed and for any materials or Plant so destroyed or damaged and, so far as may be required by the Engineer or as may be necessary for the completion of the Works, to payment for:

- (a) rectifying any such destruction or damage to the Works, and
- (b) replacing or rectifying such materials or Contractor's Equipment,

and the Engineer shall determine an addition to the Contract Price in accordance with Clause 52 (which shall in the case of the cost of replacement of Contractor's Equipment include the fair market value thereof as determined by the Engineer) and shall notify the Contractor accordingly, with a copy to the Employer.

65.4

Projectile, Missile

Destruction, damage, injury or loss of life caused by the explosion or impact, whenever and wherever occurring, of any mine, bomb, shell, grenade, or other projectile, missile, munition, or explosive of war, shall be deemed to be a consequence of the said special risks.

65.5

Increased Costs arising from Special Risks

Save to the extent that the Contractor is entitled to payment under any other provision of the Contract, the Employer shall repay to the Contractor any costs of

the execution of the Work (other than such as may be attributable to the cost of reconstructing work condemned under the provisions of Clause 39 prior to the occurrence of any special risk) which are howsoever attributable to or consequent on or the result of or in any way whatsoever connected with the said special risks, subject however to the provisions in this Clause hereinafter contained in regard to outbreak of war, but the Contractor shall, as soon as any such cost comes to his knowledge, forthwith notify the Engineer thereof. The Engineer shall, after due consultation with the Employer and the Contractor, determine the amount of the Contractor's costs in respect thereof which shall be added to the Contract Price and shall notify the Contractor accordingly, with a copy to the Employer.

65.6 Outbreak of War

If, during the currency of the Contract, there is an outbreak of war, whether war is declared or not, in any part of the world which, whether financially or otherwise, materially affects the execution of the Works, the Contractor shall, unless and until the Contract is terminated under the provisions of this Clause, continue to use his best endeavour to complete the execution of the Works. Provided that the Employer shall be entitled, at any time after such outbreak of war, to terminate the Contract by giving notice to the Contractor and, upon such notice being given, the Contract shall, except as to the rights of

the parties under this clause and Clause 67, terminate, but without prejudice to the rights of either party in respect of any antecedent breach thereof.

65.7 Removal of Contractor's Equipment on Termination

If the Contract is terminated under the provisions of Sub-Clause 65.6, the Contractor shall, with all reasonable dispatch, remove from the Site all Contractor's Equipment and shall give similar facilities to his Subcontractors to do so.

65.8 Payment if Contract Terminated

If the Contract is terminated as aforesaid, the Contractor shall be paid by the Employer, insofar as such amounts or items have not already been covered by payments on account made to the Contractor, for all work executed prior to the date of termination at the rates and prices provided in the Contract and in addition:

(a) the amounts payable in respect of any preliminary items referred to in the Bill of Quantities, so far as the work or service comprised therein has been carried out or performed, and a proper portion of any such items which have been partially carried out or performed;

(b) the cost of materials, Plant or goods reasonably ordered for the Works which have been delivered to the Contractor or of which the Contractor is legally liable to accept delivery, such materials, Plant or goods becoming the property of the Employer upon such payments being made by him;

(c) a sum being the amount of any expenditure reasonably incurred by the Contractor in the expectation of completing the whole of the Works insofar as such

expenditure has not been covered by any other payments referred to in this Sub-Clause;

(d) any additional sum payable under the provisions of Sub-Clauses 65.3 and 65.5;

(e) such proportion of the cost as may be reasonable, taking into account payments made or to be made for work executed, of removal of Contractor's Equipment under Sub-Clause 65.7 and, if required by the Contractor, return thereof to the Contractor's main plant yard in his country of registration or to other destination, at no greater cost; and

(f) the reasonable cost of repatriation of all the Contractor's staff and workmen employed on or in connection with the Works at the time of such termination.

Provided that against any payment due from the Employer under this Sub-Clause, the Employer shall be entitled to be credited with any outstanding

balances due from the Contractor for advances in respect of Contractor's Equipment, materials and Plant and any other sums which, at the date of termination, were recoverable by the Employer from the Contractor under the terms of Contract. Any sums payable under this Sub-Clause shall, after due consultation with the Employer and the Contractor, be determined by the Engineer who shall notify the Contractor accordingly, with a copy to the Employer.

Release from Performance

66.1 Payment in Event of Release from Performance

If any circumstance outside the control of both parties arises after the issue of the Letter of Acceptance which renders it impossible or unlawful for either party to fulfill his or their contractual obligations, or under the law governing the Contract the parties are released from further performance, then the parties shall be discharged from the Contract, except as to their rights under this Clause and Clause 67 and without prejudice to the rights of either party in respect of any antecedent breach of the Contract, and the sum payable by the Employer to the Contractor in respect of the work executed shall be the same as that which would have been payable under Clause 65 if the Contract had been terminated under the provisions of Clause 65.

Settlement of Disputes

67.1 Engineer's Decision

If a dispute of any kind whatsoever arises between the Employer and the Contractor in connection with, or arising out of, the Contract or the execution of the Works, whether during the execution of the Works or after their completion and whether before or after repudiation or other termination of the Contract,

including any dispute as to any opinion, instruction, determination, certificate or valuation of the Engineer, 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 eighty-fourth day after the day on which he received such reference the Engineer shall give notice of his decision to the Employer and the Contractor. Such decision shall state that it is made pursuant to this Clause.

Unless the Contract has already been repudiated or terminated, the Contractor shall, in every case, continue to proceed with the Works 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 amicable settlement or an arbitral award.

If either the Employer or the Contractor be dissatisfied with any decision of the Engineer, or if the Engineer fails to give notice of his decision on or before

the eighty-fourth day on which he received the reference, then either the Employer or the Contractor may, on or before the seventieth day after the day on which he received notice of such decision, or on or before the seventieth day after the day on which the said period of 84 days expired, as the case may be, give notice to the other party, with a copy for information to the Engineer, of his intention to commence arbitration, as hereinafter provided, as to the matter in dispute. Such notice shall establish the entitlement of the party giving the same to commence arbitration, as hereinafter provided, as to such dispute and, subject to Sub-Clause 67.4, no arbitration in respect thereof may be commenced unless such notice is given.

If the Engineer has given notice of his decision as to a matter in dispute to the Employer and the Contractor and no notice of intention to commence arbitration as to such dispute has been given by either the Employer or the Contractor on or before the seventieth day after the day on which the parties received notice as to such decision from the Engineer, the said decision shall become final and binding upon the Employer and the Contractor.

67.2

Amicable Settlement

Where notice of intention to commence arbitration as to a dispute has been given in accordance with Sub-Clause 67.1, the parties shall attempt to settle such dispute amicably before the commencement of arbitration. Provided that, unless the parties otherwise agree, arbitration may be commenced on or after the fifty-sixth day after the day on which notice of intention to commence arbitration of such dispute was given, even if no attempt at amicable settlement thereof has been made.

67.3 **Arbitration**

Any dispute in respect of which:

- (a) the decision, if any, of the Engineer has not become final and binding pursuant to Sub-Clause 67.1, and
- (b) amicable settlement has not been reached within the period stated in Sub-Clause 67.2,

shall be finally settled, unless otherwise specified in the Contract, under the Rules of Conciliation and Arbitration of the International Chamber of Commerce by one or more arbitrators appointed under such Rules. The said arbitrator/s shall have full power to open up, review and revise any decision, opinion, instruction, determination, certificate or valuation of the Engineer related to the dispute.

Neither party shall be limited in the proceedings before such arbitrator/s to the evidence or arguments put before the Engineer for the purpose of obtaining his said decision pursuant to Sub-Clause 67.1. No such decision shall disqualify the Engineer from being called as a witness and giving evidence before the arbitrator/s on any matter whatsoever relevant to the dispute.

Arbitration may be commenced prior to or after completion of the Works, provided that the obligations of the Employer, the Engineer and the Contractor shall not be altered by reason of the arbitration being conducted during the progress of the Works.

67.4 **Failure to Comply with Engineer's Decision**

Where neither the Employer nor the Contractor has given notice of intention to commence arbitration of a dispute within the period stated in Sub-Clause 67.1 and the related decision has become final and binding, either party may, if the other party fails to comply with such decision, and without prejudice to any other rights it may have, refer the failure to arbitration in accordance with Sub-Clause 67.3. The provisions of Sub-Clause 67.1 and 67.2 shall not apply to any such reference.

Notices

68.1 **Notice to Contractor**

All certificates, notices or instructions to be given to the Contractor by the Employer or the Engineer under the terms of the Contract shall be sent by post, cable, telex or facsimile transmission to or left at the Contractor's principal place of business or such other address as the Contractor shall nominate for that purpose.

68.2 **Notice to Employer and Engineer**

Any notice to be given to the Employer or to the Engineer under the terms of the Contract shall be sent by post, cable, telex or facsimile transmission to or left at the respective addresses nominated for that purpose in Part II of these Conditions.

68.3 **Change of Address**

Either party may change a nominated address to another address in the country where the Works are being executed by prior notice to the other party, with a copy to the Engineer, and the Engineer may do so by prior notice to both parties.

Default of Employer

69.1 **Default of Employer**

In the event of the Employer:

- (a) failing to pay to the Contractor the amount due under any certificate of the Engineer within 28 days after the expiry of the time stated in Sub-Clause 60.10 within which payment is to be made, subject to any deduction that the Employer is entitled to make under the Contract,
- (b) interfering with or obstructing or refusing any required approval to the issue of any such certificate,
- (c) becoming bankrupt or, being a company, going into liquidation, other than for the purpose of a scheme of reconstruction or amalgamation, or
- (d) giving notice to the Contractor that for economic reasons it is impossible for him to continue to meet his contractual obligations,

the Contractor shall be entitled to terminate his employment under the Contract by giving notice to the Employer, with a copy to the Engineer. Such termination shall take effect 14 days after the giving of the notice.

69.2 **Removal of Contractor's Equipment**

Upon the expiry of the 14 days' notice referred to in Sub-Clause 69.1, the Contractor shall, notwithstanding the provisions of Sub-Clause 54.1, with all reasonable despatch, remove from the Site all Contractor's Equipment brought by him thereon.

69.3 **Payment on Termination**

In the event of such termination the Employer shall be under the same obligations to the Contractor in regard to payment as if the Contract had been terminated under the provisions of Clause 65, but, in addition to the payments specified in Sub-Clause 65.8, the Employer shall pay to the Contractor the amount of any loss or damage to the Contractor arising out of or in connection with or by consequence of such termination.

69.4 **Contractor's Entitlement to Suspend Work**

Without prejudice to the Contractor's entitlement to interest under Sub-Clause 60.10 and to terminate under Sub-Clause 69.1, the Contractor may, if the Employer

fails to pay the Contractor the amount due under any certificate of the Engineer within 28 days after the expiry of the time stated in Sub-Clause 60.10 within which payment is to be made, subject to any deduction that the Employer is entitled to make under the Contract, after giving 28 days' prior notice to the Employer, with a copy to the Engineer, suspend work or reduce the rate of work.

If the Contractor suspends work or reduces the rate of work in accordance with the provisions of this Sub-Clause and thereby suffers delay or incurs costs the Engineer shall, after due consultation with the Employer and the Contractor, determine:

- (a) any extension of time to which the Contractor is entitled under Clause 44, and
- (b) the amount of such costs, which shall be added to the Contract Price,

and shall notify the Contractor accordingly, with a copy to the Employer.

69.5 Resumption of Work

Where the Contractor suspends work or reduces the rate of work, having given notice in accordance with Sub-Clause 69.4, and the Employer subsequently pays the amount due, including interest pursuant to Sub-Clause 60.10, the Contractor's entitlement under Sub-Clause 69.1 shall, if notice of termination has not been given, lapse and the Contractor shall resume normal working as soon as is reasonably possible.

Changes in Cost and Legislation

70.1 Increase or Decrease of Cost

There shall be added to or deducted from the Contract Price such sums in respect of rise or fall in the cost of labour and/or materials or any other matters affecting the cost of the execution of the Works as may be determined in accordance with part II of these Conditions.

70.2 Subsequent Legislation

If, after the date 28 days prior to the latest date for submission of tenders for the Contract there occur in the country in which the Works are being or are to be executed changes to any National or State Statute, Ordinance, Decree or other Law or any regulation or bye-law of any local or other duly constituted authority, or the introduction of any such State Statute, Ordinance, Decree, Law, regulation or bye-law which causes additional or reduced cost to the Contractor, other than under Sub-Clause 70.1, in the execution of the Contract, such additional or reduced cost shall, after due consultation with the Employer and the Contractor, be determined by the Engineer and shall be added to or deducted from the Contract Price and the Engineer shall notify the Contractor accordingly, with a copy to the Employer.

Currency and Rates of Exchange

71.1 Currency Restrictions

If, after the date 28 days prior to the latest date for submission of tenders for the

Contract, the Government or authorized agency of the Government of the country in which the Works are being or are to be executed imposes currency restrictions and/or transfer of currency restrictions in relation to the currency or currencies in which the Contract Price is to be paid, the Employer shall reimburse any loss or damage to the Contractor arising therefrom, without prejudice to the right of the Contractor to exercise any other rights or remedies to which he is entitled in such event.

72.1 Rates of Exchange

Where the Contract provides for payment in whole or in part to be made to the Contractor in foreign currency or currencies, such payment shall not be subject to variations in the rate or rates of exchange between such specified foreign currency or currencies and the currency of the country in which the Works are to be executed.

72.2 Currency Proportions

Where the Employer has required the Tender to be expressed in a single currency but with payment to be made in more than one currency and the Contractor has stated the proportions or amounts of other currency or currencies in which he requires payment to be made, the rate or rates of exchange applicable for calculating the payment of such proportions or amounts shall, unless otherwise stated in Part II of these Conditions, be those prevailing, as determined by the Central Bank of the country in which the Works are to be executed, on the date 28 days prior to the latest date for the submission of tenders for the Contract, as has been notified to the Contractor by the Employer prior to the submission of tenders or as provided for in the Tender.

72.3 Currencies of Payment for Provisional Sums

Where the Contract provides for payment in more than one currency, the proportions or amounts to be paid in foreign currencies in respect of Provisional Sums shall be determined in accordance with the principles set forth in Sub-Clauses 72.1 and 72.2 as and when these sums are utilised in whole or in part in accordance with the provisions of Clauses 58 and 59.

REFERENCE TO PART II

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PART I GENERAL CONDITIONS

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PARTICULAR CONDITIONS OF CONTRACT



FEDERATION INTERNATIONALE DES INGENIEURS-CONSEIL

CONDITIONS OF CONTRACT FOR WORKS OF CIVIL ENGINEERING CONSTRUCTION

The Condition of Contract, Part-I: General Conditions shall be those forming Part-I of the “Conditions of Contract for Works of Civil Engineering Construction”, fourth edition 1987, reprinted in 1992 with further amendments, prepared by the Federation International Des Ingénieurs-Conseils (FIDIC). These Conditions are subject to the variations and additions set out in Part-II hereof entitled “Particular Conditions of Contract.”

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PART II - PARTICULAR CONDITIONS OF CONTRACT

1.1 Definitions

- (i) The Employer is NED University of Engineering and Technology Karachi.
- (ii) The Engineer is M/s. TACE Pvt. Ltd. R-210 Abid Town Karachi

The following paragraph is added:

- (a)(vi) “Bidder or Tenderer” means any person or persons, company, corporation, firm or joint venture submitting a Bid or Tender.

- (b)(v) The following is added at the end of the paragraph:

The word “Tender” is synonymous with “Bid” and the word “Tender Documents” with “Bidding Documents”.

The following paragraph is added:

- (b)(ix) “Programme” means the programme to be submitted by the Contractor in accordance with Sub-Clause 14.1 and any approved revisions thereto.

- (e)(i) The text is deleted and substituted with the following:

“Contract Price” means the sum stated in the Letter of Acceptance as payable to the Contractor for the execution and completion of the Works subject to such additions thereto or deductions therefrom as may be made and remedying of any defects therein in accordance with the provisions of the Contract.

2.1 Engineer's Duties and Authority

With reference to Sub-Clause 2.1(b), the following provisions shall also apply;

The Engineer shall obtain the specific approval of the Employer before carrying out his duties in accordance with the following Clauses:

- (i) Consenting to the sub-letting of any part of the Works under Sub-Clause 4.1 “Subcontracting”.
- (ii) Certifying additional cost determined under Sub-Clause 12.2 “Not Foreseeable Physical Obstructions or Conditions”.
- (iii) Any action under Clause 10 “Performance Security” and Clauses 21,23,24 & 25 “Insurance” of sorts.
- (iv) Any action under Clause 40 “Suspension”.
- (v) Any action under Clause 44 “Extension of Time for Completion”.

- (vi) Any action under Clause 47 “Liquidated Damages for Delay” or Payment of Bonus for Early Completion of Works (PCC Sub-Clause 47.3).
- (vii) Issuance of “Taking Over Certificate” under Clause 48.
- (viii) Issuing a Variation Order under Clause 51, except:
 - a) in an emergency* situation, as stated herebelow, or
 - b) if such variation would increase the Contract Price by less than the amount stated in the Appendix-A to Bid.
- (ix) Fixing rates or prices under Clause 52.
- (x) Extra payment as a result of Contractor’s claims under Clause 53.
- (xi) Release of Retention Money to the Contractor under Sub-Clause 60.3 “Payment of Retention Money”.
- (xii) Issuance of “Final Payment Certificate” under Sub-Clause 60.8.
- (xiii) Issuance of “Defect Liability Certificate” under Sub-Clause 62.1.
- (xiv) Any change in the ratios of Contract currency proportions and payments thereof under Clause 72 “Currency and Rate of Exchange”.

* (If in the opinion of the Engineer an emergency occurs affecting the safety of life or of the Works or of adjoining property, the Engineer may, without relieving the Contractor of any of his duties and responsibilities under the Contract, instruct the Contractor to execute all such work or to do all such things as may, in the opinion of the Engineer, be necessary to abate or reduce the risk. The Contractor shall forthwith comply with any such instruction of the Engineer. The Engineer shall determine an addition to the Contract Price, in respect of such instruction, in accordance with Clause 52 and shall notify the Contractor accordingly, with a copy to the Employer.)

2.2 Engineer’s Representative

The following paragraph is added:

The Employer shall ensure that the Engineer’s Representative is a professional engineer as defined in the Pakistan Engineering Council Act 1975 (V of 1976)

The following Sub-Clauses 2.7 and 2.8 are added:

2.7 Engineer Not Liable

Approval, reviews and inspection by the Engineer of any part of the Works does not relieve the Contractor from his sole responsibility and liability for the supply of materials, plant and equipment for construction of the Works and their parts in

accordance with the Contract and neither the Engineer's authority to act nor any decision made by him in good faith as provided for under the Contract whether to exercise or not to exercise such authority shall give rise to any duty or responsibility of the Engineer to the Contractor, any Subcontractor, any of their representatives or employees or any other person performing any portion of the Works.

2.8 Replacement of the Engineer

“If the Employer intends to replace the Engineer, the Employer shall, not less than 14 days before the intended date of replacement, give notice to the Contractor, of the name, address and relevant experience of the intended replacement Engineer. The Employer shall not replace the Engineer with a person against whom the Contractor raises reasonable objection by notice to the Employer, with supporting particulars.”

5.1 Language(s) and Law

- (a) The Contract Documents, shall be drawn up in the English language.
- (b) The Contract shall be subject to the Laws of Islamic Republic of Pakistan.

5.2 Priority of Contract Documents

The documents listed at (1) to (6) of the Sub-Clause are deleted and substituted with the following:

- (1) The Contract Agreement (if completed);
- (2) The Letter of Acceptance;
- (3) The completed Form of Bid;
- (4) Special Stipulations (Appendix-A to Bid);
- (5) The Particular Conditions of Contract – Part II;
- (6) The General Conditions – Part I;
- (7) The priced Bill of Quantities (Appendix-D to Bid);
- (8) The completed Appendices to Bid (B, C, E to L);
- (9) The Drawings;

- (10) The Specifications; and
- (11) _____ (any other).

In case of discrepancies between drawings, those of larger scale shall govern unless they are superseded by a drawing of later date regardless of scale. All Drawings and Specifications shall be interpreted in conformity with the Contract and these Conditions. Addendum, if any, shall be deemed to have been incorporated at the appropriate places in the documents forming the Contract.

The following Sub-Clauses 6.6 and 6.7 are added:

6.6 Shop Drawings

The Contractor shall submit to the Engineer for review 3 copies of all shop and erection drawings applicable to this Contract as per provision of relevant Sub-Clause of the Contract.

Review and approval by the Engineer shall not be construed as a complete check

but will indicate only that the general method of construction and detailing is satisfactory and that the Engineer's review or approval shall not relieve the Contractor of any of his responsibilities under the Contract.

6.7 As-Built Drawings

At the completion of the Works under the Contract, the Contractor shall furnish to the Engineer 6 copies and one reproducible of all drawings amended to conform with the Works as built. The price of such Drawings shall be deemed to be included in the Contract Price.

10.1 Performance Security

The text is deleted and substituted with the following:

The Contractor shall provide Performance Security to the Employer in the prescribed form. The said Security shall be furnished or caused to be furnished by the Contractor within 28 days after the receipt of the Letter of Acceptance. The Performance Security shall be of an amount equal to 05% of the Contract Price stated in the Letter of Acceptance. Such Security shall be in the form of bank guarantee from any Scheduled Bank in Pakistan.

The cost of complying with requirements of this Sub-Clause shall be borne by the Contractor.

The following Sub-Clause 10.4 is added:

10.4 Performance Security Binding on Variations and Changes

The Performance Security shall be binding irrespective of changes in the quantities or variations in the Works or extensions in Time for Completion of the Works which are granted or agreed upon under the provisions of the Contract.

14.1 Programme to be Submitted

The programme shall be submitted within 42 days from the date of receipt of Letter of Acceptance, which shall be in the form of:

- i) a Bar Chart identifying the critical activities.

14.3 Cash Flow Estimate to be Submitted

The detailed Cash Flow Estimate shall be submitted within 21 days from the date of receipt of Letter of Acceptance

The following Sub-Clause 14.5 is added:

14.5 Detailed Programme and Monthly Progress Report

- a) For purposes of Sub-Clause 14.1, the Contractor shall submit to the Engineer detailed programme for the following:
 - (1) Execution of Works;
 - (2) Labour Employment;
 - (3) Local Material Procurement;
 - (4) Material Imports, if any; and
 - (5) Other details as required by the Engineer.
- (b) During the period of the Contract, the Contractor shall submit to the Engineer not later than the 8th day of the following month, 10 copies each of Monthly Progress Reports covering:
 - (1) A Construction Schedule indicating the monthly progress in percentage;
 - (2) Description of all work carried out since the last report;
 - (3) Description of the work planned for the next 56 days sufficiently detailed to enable the Engineer to determine his programme of inspection and testing;
 - (4) Monthly summary of daily job record;
 - (5) Photographs to illustrate progress ;and
 - (6) Information about problems and difficulties encountered, if any, and proposals to overcome the same.
- (c) During the period of the Contract, the Contractor shall keep a daily record of the work progress, which shall be made available to the Engineer as and when requested. The daily record shall include particulars of weather conditions, number of men working, deliveries of materials, quantity, location and assignment of Contractor's equipment.

The following Sub-Clauses 15.2 and 15.3 are added:

15.2 Language Ability of Contractor's Representative

The Contractor's authorised representative shall be fluent in the English language. Alternately an interpreter with ability of English language shall be provided by the Contractor on full time basis.

15.3 Contractor's Representative

The Contractor's authorised representative and his other professional engineers working at Site shall register themselves with the Pakistan Engineering Council.

The Contractor's authorised representative at Site shall be authorised to exercise adequate administrative and financial powers on behalf of the Contractor so as to achieve completion of the Works as per the Contract.

The following Sub-Clauses 16.3 and 16.4 are added:

16.3 Language Ability of Superintending Staff of Contractor

A reasonable proportion of the Contractor's superintending staff shall have a working knowledge of the English language. If the Contractor's superintending staff are not fluent in English language, the Contractor shall make competent interpreters available during all working hours in a number deemed sufficient by the Engineer.

16.4 Employment of Local Personnel

The Contractor is encouraged, to the extent practicable and reasonable, to employ staff and labour from sources within Pakistan.

The following Sub-Clauses 19.3 and 19.4 are added:

19.3 Safety Precautions

In order to provide for the safety, health and welfare of persons, and for prevention of damage of any kind, all operations for the purposes of or in connection with the Contract shall be carried out in compliance with the Safety Requirements of the Government of Pakistan with such modifications thereto as the Engineer may authorise or direct and the Contractor shall take or cause to be taken such further measures and comply with such further requirements as the Engineer may determine to be reasonably necessary for such purpose.

The Contractor shall make, maintain and submit reports to the Engineer concerning safety, health and welfare of persons and damage to property, as the Engineer may from time to time prescribe.

19.4 Lighting Work at Night

In the event of work being carried out at night, the Contractor shall at his own cost, provide and maintain such good and sufficient light as will enable the work to proceed satisfactorily and without danger. The approaches to the Site and the Works where the night-work is being carried out shall be sufficiently lighted. All arrangement adopted for such lighting shall be to the satisfaction of the Engineer's Representative.

20.4 Employer's Risks

The Employer's risks are:

Delete the text and substitute with the following:

- (a) insofar as they directly affect the execution of the Works in Pakistan:
 - (i) war and hostilities (whether war be declared or not), invasion, act of foreign enemies,
 - (ii) rebellion, revolution, insurrection, or military or usurped power, or civil war,
 - (iii) ionizing radiations, or contamination by radioactivity from any nuclear fuel, or from any nuclear waste from the combustion of nuclear fuel, radioactive toxic explosive or other hazardous properties of any explosive nuclear assembly or nuclear component thereof,
 - (iv) pressure waves caused by aircraft or other aerial devices travelling at sonic or supersonic speeds,

- (v) riot, commotion or disorder, unless solely restricted to the employees of the Contractor or of his Subcontractors and arising from the conduct of the Works;
- (b) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract;
- (c) loss or damage to the extent that it is due to the design of the Works, other than any part of the design provided by the Contractor or for which the Contractor is responsible; and
- (d) any operation of the forces of nature (insofar as it occurs on the Site) which an experienced contractor:
 - (i) could not have reasonably foreseen, or
 - (ii) could reasonably have foreseen, but against which he could not reasonably have taken at least one of the following measures:
 - (a) prevent loss or damage to physical property from occurring by taking appropriate measures, or
 - (b) insure against.

21.1 Insurance of Works and Contractor's Equipment

(Employer may vary this Sub-Clause 21.1 (b))

21.4 Exclusions

The text is deleted and substituted with the following:

There shall be no obligation for the insurances in Sub-Clause 21.1 to include loss or damage caused by the risks listed under Sub-Clause 20.4 paras (a) (i) to (iv).

The following Sub-Clause 25.5 is added:

25.5 Insurance Company

The Contractor shall be obliged to place all insurances relating to the Contract (including, but not limited to, the insurances referred to in Clauses 21, 23 and 24) with either National Insurance Company of Pakistan or any other insurance company operating in Pakistan and acceptable to the Employer.

Costs of such insurances shall be borne by the Contractor.

The following Sub-Clause 31.3 is added:

31.3 Co-operation with other Contractors

During the execution of the Works, the Contractor shall co-operate fully with other contractors working for the Employer at and in the vicinity of the Site and also shall provide adequate precautionary facilities not to make himself a nuisance to local residents and other contractors.

The following Sub-Clauses 34.2 to 34.12 are added:

34.2 Rates of Wages and Conditions of Labour

The Contractor shall pay rates of wages and observe conditions of labour not less favourable than those established for the trade or industry where the work is carried out. In the absence of any rates of wages or conditions of labour so established, the Contractor shall pay rates of wages and observe conditions of labour which are not less favourable than the general level of wages and conditions observed by other employers whose general circumstances in the trade or in industry in which the Contractor is engaged are similar.

34.3 Employment of Persons in the Service of Others

The Contractor shall not recruit his staff and labour from amongst the persons in the services of the Employer or the Engineer; except with the prior written consent of the Employer or the Engineer, as the case may be.

34.4 Housing for Labour

Save insofar as the Contract otherwise provides, the Contractor shall provide and maintain such housing accommodation and amenities as he may consider necessary for all his supervisory staff and labour, employed for the purposes of or in connection with the Contract including all fencing, electricity supply, sanitation, cookhouses, fire prevention, water supply and other requirements in connection with such housing accommodation or amenities. On completion of the Contract, these facilities shall be handed over to the Employer or if the Employer so desires, the temporary camps or housing provided by the Contractor shall be removed and the Site reinstated to its original condition, all to the approval of the Engineer.

34.5 Health and Safety

Due precautions shall be taken by the Contractor, and at his own cost, to ensure the safety of his staff and labour at all times throughout the period of the Contract. The Contractor shall further ensure that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements.

34.6 Epidemics

In the event of any outbreak of illness of an epidemic nature, the Contractor shall comply with and carry out such regulations, orders and requirements as may be made by the Government, or the local medical or sanitary authorities, for purpose of dealing with and overcoming the same.

34.7 Supply of Water

The Contractor shall, so far as is reasonably practicable, having regard to local conditions, provide on the Site, to the satisfaction of the Engineer or his representative, adequate supply of drinking and other water for the use of his staff and labour.

34.8 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Statutes, Ordinances and Government Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor or drugs, or permit or suffer any such importation, sale, gift, barter or disposal by his Subcontractors, agents, staff or labour.

34.9 Arms and Ammunition

The Contractor shall not give, or otherwise dispose of to any person or persons, any arms or ammunition of any kind or permit or suffer the same as aforesaid.

34.10 Festivals and Religious Customs

The Contractor shall in all dealings with his staff and labour have due regard to all recognised festivals, days of rest and religious and other customs.

34.11 Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst staff and labour and for the preservation of peace and protection of persons and property in the neighbourhood of the Works against the same.

34.12 Compliance by Subcontractors

The Contractor shall be responsible for compliance by his Subcontractors of the provisions of this Clause.

The following Sub-Clauses 35.2 and 35.3 are added:

35.2 Records of Safety and Health

The Contractor shall maintain such records and make such reports concerning safety, health and welfare of persons and damage to property as the Engineer may from time to time prescribe.

35.3 Reporting of Accidents

The Contractor shall report to the Engineer details of any accident as soon as possible after its occurrence. In the case of any fatality or serious accident, the Contractor shall, in addition, notify the Engineer immediately by the quickest available means.

The following Sub-Clause 36.6 is added:

36.6 Use of Pakistani Materials and Services

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

41.1 Commencement of Works

The text is deleted and substituted with the following:

The Contractor shall commence the Works on Site within the period named in Appendix-A to Bid from the date of receipt by him from the Engineer of a written Notice to Commence. Thereafter, the Contractor shall proceed with the Works with due expedition and without delay.

The following Sub-Clause 47.3 is added:

48.2 Taking Over of Sections or Parts

For the purposes of para (a) of this Sub-Clause, separate Times for Completion shall be provided in the Appendix-A to Bid “Special Stipulations”.

51.2 Instructions for Variations

At the end of the first sentence, after the word “Engineer”, the words “in writing” are added.

52.1 Valuation of Variations

In the tenth line, after the words “Engineer shall” the following is added: within a period not exceeding one-eighth of the completion time subject to a minimum of 56 days from the date of disagreement whichever is later.

53.4 Failure to Comply

This Sub-Clause is deleted in its entirety.

54.3 Customs Clearance

(Employer may vary this Sub-Clause)

54.5 Conditions of Hire of Contractor’s Equipment

The following paragraph is added:

The Contractor shall, upon request by the Engineer at any time in relation to any item of hired Contractor’s Equipment, forthwith notify the Engineer in writing the name and address of the Owner of the equipment and shall certify that the agreement for the hire thereof contains a provision in accordance with the requirements set forth above.

The following Sub-Clauses 59.4 & 59.5 are added:

59.4 Payments to Nominated Subcontractors

The Contractor shall pay to the nominated Subcontractor the amounts which the Engineer certifies to be due in accordance with the subcontract. These amounts plus other charges shall be included in the Contract Price in accordance with Clause 58 [Provisional Sums], except as stated in Sub-Clause 59.5 [Certification of Payments].

59.5 Certification of Payments & Nominated Subcontractors

Before issuing a Payment Certificate which includes an amount payable to a nominated Subcontractor, the Engineer may request the Contractor to supply reasonable evidence that the nominated Subcontractor has received all amounts due in accordance with previous Payment Certificates, less applicable deductions for retention or otherwise. Unless the Contractor:

- a) submits reasonable evidence to the Engineer, or
- b) i) satisfies the Engineer in writing that the Contractor is reasonably entitled to withhold or refuse to pay these amounts, and
- ii) submits to the Engineer reasonable evidence that the nominated Subcontractor has been notified of the Contractor's entitlement,

then the Employer may (at his sole discretion) pay direct to the nominated Subcontractor, part or all of such amounts previously certified (less applicable deductions) as are due to the nominated Subcontractor and for which the Contractor has failed to submit the evidence described in sub-paragraphs (a) or (b) above. The Contractor shall then repay, to the Employer, the amount which the nominated Subcontractor was directly paid by the Employer.

60.1 Monthly Statements

In the first line after the word "shall", the following is added:

"on the basis of the joint measurement of work done under Clause 56.1,"

In Para (c) the words "the Appendix to Tender" are deleted and substituted with the words "Sub-Cause 60.11 (a)(6) hereof".

(in case Clause 60.11 is applicable)

60.2 Monthly Payments

In the first line, "28" is substituted by "14".

60.10 Time for Payment

The text is deleted and substituted with the following:

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 for 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.

The following Sub-Clause 60.11 is added:

60.11 Secured Advance on Materials

- a) The Contractor shall be entitled to receive from the Employer Secured Advance against an indemnity bond acceptable to the Employer of such sum as the Engineer may consider proper in respect of non-perishable materials brought at the Site but not yet incorporated in the Permanent Works provided that:
 - (1) The materials are in accordance with the Specifications for the Permanent Works;
 - (2) Such materials have been delivered to the Site and are properly stored and protected against loss or damage or deterioration to the satisfaction of the Engineer but at the risk and cost of the Contractor;
 - (3) The Contractor's records of the requirements, orders, receipts and use of materials are kept in a form approved by the Engineer, and such records shall be available for inspection by the Engineer;
 - (4) The Contractor shall submit with his monthly statement the estimated value of the materials on Site together with such documents as may be required by the Engineer for the purpose of valuation of materials and providing evidence of ownership and payment therefor;
 - (5) Ownership of such materials shall be deemed to vest in the Employer and these materials shall not be removed from the Site or otherwise disposed of without written permission of the Employer; and
 - (6) The sum payable for such materials on Site shall not exceed 75 % of the (i) landed cost of imported materials, or (ii) ex-factory /ex-warehouse price of locally manufactured or produced materials, or (iii) market price of other materials.

(b) The recovery of Secured Advance paid to the Contractor under the above provisions shall be effected from the monthly payments on actual consumption basis.

60.12 Financial Assistance to Contractor

Financial assistance shall be made available to the Contractor by the Employer by adopting any one of the following three Alternatives:

Mobilization Advance

“Mobilization Advance”, After signing the Contract commencement of work and in exchange for the Performance Bond and a separate guarantee for the amount of the Mobilization advance the Contractor shall receive from the engineer and advance payment Certificate for an amount equal to ten (10) percent of the Contract Value less any sum for the contingencies if included in the Contract Value.

The guarantee for the full amount of the Mobilization advance shall be from scheduled bank of Pakistan and in the form appended herewith together with any modifications, additions or deletions that the Employer may consider necessary. The conditions of the guarantee shall bind the Guarantor to pay the Employer in full or part of the Advance Payment which remains not repaid by the Contractor to the Employer and which the Contractor has failed to repay in accordance with this clause.

The Advance payment made by the Employer shall be recovered from the Contractor at the rate of not less than 10% of each payment invoice of the contractor.

This guarantee shall be valid for the period to be mentioned in the Guarantee or until full recovery of the advance Payment whichever is the later.

If, however, the Advance Payment is recovered in full prior to the end of the said period, the Contractor make application to the Employer for the release of the guarantee which will not be unreasonable with-held.

63.1 Default of Contractor

The following para is added at the end of the Sub-Clause:

Provided further that in addition to the action taken by the Employer against the Contractor under this Clause, the Employer may also refer the case of default of the Contractor to Pakistan Engineering Council for punitive action under the Construction and Operation of Engineering Works Bye-Laws 1987, as amended from time to time.

65.2 Special Risks

The text is deleted and substituted with the following:

The Special Risks are the risks defined under Sub-Clause 20.4 sub paragraphs (a) (i) to (a) (v).

67.3 Arbitration

In the sixth to eight lines, the words “shall be finally settled appointed under such Rules” are deleted and substituted with the following:

shall be finally settled under the provisions of the Arbitration Act, 1940 as amended or any statutory modification or re-enactment thereof for the time being in force.

The following paragraph is added:

The place of arbitration shall be Karachi, Pakistan.

68.1 Notice to Contractor

The following paragraph is added:

For the purposes of this Sub-Clause, the Contractor shall, immediately after receipt of Letter of Acceptance, intimate in writing to the Employer and the Engineer by registered post, the address of his principal place of business or any change in such address during the period of the Contract.

68.2 Notice to Employer and Engineer

For the purposes of this Sub-Clause, the respective address are:

a) The Employer :

*Focal Person /Engineer Construction of Access Road and
Walkways to Girls Hostel at NED University of Engineering and Technology,
Karachi*

b) The Engineer:

Engr. Dr. Ashar Ahmed NED University

Tel: 021-99261261-8 (Ext:2451)

70.1 Increase or decrease of cost

Delete the entire text of this Sub-Clause and substitute as follows:

The amounts payable to the Contractor, pursuant to Sub-Clause 60.1, shall be adjusted in respect of the rise or fall in the cost of labor, materials, and other inputs to the Works, by applying to such amount the formula prescribed in this Sub-Clause.

(a) Other Changes in Cost

To the extent that full compensation for any rise or fall in costs to the Contractor is not covered by the provisions of this or other Clauses in the Contract, the unit rates and prices included in the Contract shall be deemed to include amounts to cover the contingency of such other rise or fall of costs.

(b) Adjustment Formula

The adjustment to the monthly statements in respect of changes in cost shall be determined from the following formula:-

$$\text{Where } = A + b \frac{Ln}{Lo} + c \frac{Mn}{Mo} + d \frac{Em}{Eo}$$

Pn is a price adjustment factor to be applied to the amount for the payment of the work carried out in the subject month, determined in accordance with Paragraph 60.1 (a), and with Paragraphs 60.1 (b) and (e), where any variations and daywork are not otherwise subject to adjustment;

A is a constant, specified in Appendix-C to Bid, representing the nonadjustable portion in contractual payments;

b, c, d etc. are weightages or coefficients representing the estimated proportion of each cost element (labour, cement and reinforcing steel etc.) in the Works or Sections thereof, net of Provisional Sums and Prime Cost; the sum of A, b, c, d, etc. shall be one;

Ln, Mn, En, etc. are the current cost indices or reference prices of the cost elements for month "n", determined pursuant to Sub-Clause 70.1(d), applicable to each cost element; and

Lo, Mo, Eo, etc. are the base cost indices or reference prices corresponding to the above cost elements at the date specified in Sub-Clause 70.1(d).

(c) Sources of Indices and Weightages

The sources of indices shall be those listed in Appendix-C to Bid, as approved by the Engineer. As the proposed basis for price adjustment, the Contractor shall have submitted with his bid the tabulation of Weightages and Source of Indices if different than those given in Appendix-C to Bid, which shall be subject to approval by the Engineer.

(d) Base, Current, and Provisional Indices

The base cost indices or prices shall be those prevailing on the day 28 days prior to the latest date for submission of bids. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular monthly statement is related. If at any time the current indices are not available, Provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.

(e) Adjustment after Completion

If the Contractor fails to complete the Works within the Time for Completion prescribed under Clause 43, adjustment of prices thereafter until the date of completion of the Works shall be made using either the indices or prices relating to the prescribed time for completion, or the current indices or prices, whichever is more favorable to the Employer, provided that if an extension of time is granted pursuant to Clause 44, the above provision shall apply only to adjustments made after the expiry of such extension of time.

(f) Weightages

The weightages for each of the factors of cost given in Appendix-C to Bid shall be adjusted if, in the opinion of the Engineer, they have been rendered unreasonable, unbalanced, or inapplicable as a result of varied or additional work executed or instructed under Clause 51. Such adjustment(s) shall have to be agreed in the variation order.

The following Sub-Clauses 73.1, 73.2, 74.1, 75.1, 76.1, 77.1 and 78.1 are added:

73.1 Payment of Income Tax

The Contractor, Subcontractors and their employees shall be responsible for payment of all their income tax, super tax and other taxes on income arising out of the Contract and the rates and prices stated in the Contract shall be deemed to cover all such taxes.

73.2 Customs Duty & Taxes

The cost in BoQ items should include all taxes and duties imposed by Federal/Provincial/ Government time to time

74.1 Integrity Pact

If the Contractor or any of his Subcontractors, agents or servants is found to have violated or involved in violation of the Integrity Pact signed by the Contractor as Appendix-L 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 Subcontractors, 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 Subcontractors, agents or servants.

The termination under Sub-Para (b) of this Sub-Clause shall proceed in the manner prescribed under Sub-Clauses 63.1 to 63.4 and the payment under Sub-Clause 63.3 shall be made after having deducted the amounts due to the Employer under Sub-Para (a) and (c) of this Sub-Clause.

75.1 Termination of Contract for Employer's Convenience

The Employer shall be entitled to terminate the Contract at any time for the Employer's convenience after giving 56 days prior notice to the Contractor, with a copy to the Engineer. In the event of such termination, the Contractor :

- (a) shall proceed as provided in Sub-Clause 65.7 hereof; and
- (b) shall be paid by the Employer as provided in Sub-Clause 65.8 hereof.

76.1 Liability of Contractor

The Contractor or his Subcontractors or assigns shall follow strictly, all relevant labour laws including the Workmen's Compensation Act and the Employer shall be fully indemnified for all claims, damages etc. arising out of any dispute between the Contractor, his Subcontractors or assigns and the labour employed by them.

77.1 Joint and Several Liability

If the Contractor is a joint venture of two or more persons, all such persons shall be jointly and severally bound to the Employer for the fulfilment of the terms of the Contract and shall designate one of such persons to act as leader with authority to bind the joint venture. The composition or the constitution of the joint venture shall not be altered without the prior consent of the Employer.

78.1 Details to be Confidential

The Contractor shall treat the details of the Contract as private and confidential, save in so far as may be necessary for the purposes thereof, and shall not publish or disclose the same or any particulars thereof in any trade or technical paper or elsewhere without the prior consent in writing of the Employer or the Engineer. If any dispute arises as to the necessity of any publication or disclosure for the purpose of the Contract, the same shall be referred to the decision of the Engineer whose award shall be final.

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SPECIAL PROVISIONS

SPECIAL PROVISIONS

1. General

These special provisions shall be used as supplementary and in conjunction with other contract documents and shall be deemed to be incorporated and become part of the contract documents.

All works shall be carried out in accordance with the following specifications, supplemented by detailed specifications contained in the following sections. Any inconsistencies or ambiguities shall be brought to the notice of the Engineer for his clarification/decision. Decision and direction of the Engineer, in all such cases shall be final and binding.

The Contractor shall make himself thoroughly familiar with the site conditions, foresee any and all problems likely to be encountered during execution of the works, and shall be able and ready to solve them effectively. Proposals for solutions to the problems shall be submitted to the Consultant for approval before proceeding with the work.

The Tender Drawings, Design Criteria and Specifications are to be read in conjunction and shall be mutually explanatory. In case of any conflict the order of preference shall be as under duly followed by the Special and General Conditions of Contract in Volume I of Tender & Contract documents.

- I) Specifications
- ii) Tender Drawings iii)
- Bill of Quantities

2. Scope of Work

The scope of work comprises **Construction of Access road and Walkways to Girls Hostel at NED University of Engineering and Technology, Main Campus, Karachi** works as per drawings and specification as defined hereunder and as specified in subsequent sections of tender documents. The Contractor shall perform all relevant engineering, procurement, installation, construction and execution, coordination with other services, testing and commissioning including all documentation, drawings, calculations and supply of manuals as required to complete the work. The Contractor shall also be responsible to supply and install all other items not specifically mentioned in these documents but which are necessary for proper completion of the works included in the scope of this Contract.

3. Applicable Codes and Standards

In the absence of other Standards being required by the Contract Documents, all work and materials shall meet the requirement of the Uniform Building Code of the United States, and/or applicable American Society for Testing Materials (ASTM) American Association of State Highway and Transportation Officials (AASHTO) Specifications and the latest American Concrete Institute Manual of Concrete Practice and American Institute of Steel Construction (AISC) Manual relevant to the Works except in cases where the Pakistan Building Code requires a higher standard. In such cases the Pakistani Code shall govern, where the abbreviations listed below are

used, it refers to the latest code, standards, or publications of the following organizations:

AASHTO American Association of State Highway and Transportation Officials.

ACI American Concrete Institute

AISC American Institute of Steel Construction ANSI

American National Standards Institute ASA

American Standard Association

ASCE American Society of Civil Engineers

ASTM American Society for Testing and Material

AWS American Welding Society

BSI British Standards Institute

ICAO International Civil Aviation Organization

BSICP British Standard Institute Code of

PCA Practice Portland Cement Association

PSI Pakistan Standard Institute

UBC Uniform Building Code

Should the Contractor, at any time and for any specific reasons, wish to deviate from the above standards or desires to use materials or equipment other than those provided for by the above standards, then he shall state the exact nature of the change giving the reasons for making the change and shall submit complete specifications of the materials and descriptions of the equipment for the Engineer's approval, whose decisions shall be conclusive and binding upon the Contractor.

4. Codes, Standards, Certificates

The Contractor shall supply and have at his site office:

Copies of all latest editions of codes and standards referred to in these specifications by number, or equivalent codes and standards approved by the Engineer.

Catalogues and published, recommendations from manufacturers supplying products and materials for the project.

The Contractor shall provide manufacturers or supplier's certificates to the Engineer for all products and materials which must meet the requirements of a specific code or standard as stated in these Specifications.

5. Units of Measurements

The British System of Units (FPS/SI Unit) shall be used throughout this Project.

6. Manufacturer's Recommendations

Installation of manufactured items shall be in accordance with procedures recommended by the manufacturer or as approved by the Engineer.

7. Existing Condition at Site

Drawings and information pertaining to existing project conditions are furnished for reference. Neither the Employer nor the Engineer warrants the adequacy or correctness of these.

8. Protection and Precautions

The Contractor and his sub-contractors shall afford all necessary protection to existing structures and will be required to make good at his own expense any damage done to such structures through his own or his representatives or subcontractors' fault and negligence.

The Contractor and his sub-contractors shall afford all necessary protection to existing roads in the area. He will clear and make good at his own expense any damage to or debris on these roads through his own fault and negligence. He must at all time ensure the free and normal flow of traffic and shall not cause obstruction to the traffic system. The Contractor and his sub-contractors shall provide and maintain necessary protection and precautionary measures such as warning signs, warning lamps and barricades etc. to prevent accidents.

The Contractor shall promptly correct all such damage to original condition at no additional expense to the Employer.

The Contractor shall cooperate with trades performing work under other Contracts as necessary for completion.

9. Setting Out of Work

Establish all boundaries, markers, leveling stakes and benchmarks on the site to adequately set out all work. Verify all data and their relationship to establish and Engineer's survey control points and public benchmarks and report discrepancies to the Engineer.

Permanently mark the necessary controls for distance and elevation sufficient to serve throughout the Contract and protect these control points adequately against damage and displacement.

Project setting out is for the use of all trades; each trade is responsible for the layout of its own work.

10. Sequence of Construction

The Contractor shall submit his proposal for approval of the Engineer the sequence of Construction, prior to starting the works. the works shall be executed as per approved sequence of construction.

11. Lines and Levels

Survey control points will be established by the Engineer. The Contractor shall be responsible for verifying these and shall be responsible for all requirements necessary for the execution of any work to the locations, lines, and levels specified or shown on the drawings, subject to such modifications as the Engineer may require as work progresses.

12. Partial Possession

Whenever, as determined by the Employer any portion of work performed by the Contractor is in a condition suitable for use, the Employer may take possession of or use such portion. Such use by the Employer shall in no instance be construed as constituting final acceptance, and shall neither relieve the Contractor of any of his responsibilities under the Contract, nor acts a waiver by the Employer of any of the conditions thereof, provided that the Contractor shall not be liable for the cost of repairs, re-work, or renewals which may be required due to ordinary wear and tear resulting from such use. However, if such use increases the cost or delays to the completion of remaining portions of work, the Contractor will be entitled to an equitable adjustment.

If, as a result of the Contractor's failure to comply with the provision of the Contract, such use proves to be unsatisfactory, the Consultant will have the right to continue such use until such portion of the work can, without injury to the Consultant, be taken out of service for correction of defects, errors, omissions, or replacement of unsatisfactory materials or equipment, as necessary for such work to comply with the Contract; provided that the period of such operation or pending completion of appropriate remedial action shall not exceed twelve months unless otherwise mutually agreed upon in writing between the parties.

13. Existing Services

The Contractor shall search for, find locate and protect any visible/un visible wiring, cable, duct, pipe work, etc., within or immediately adjoining the site area.

The Contractor shall take full responsibility for safety of existing service lines, utilities and utility structures uncovered or encountered during excavation, dismantling and construction operations.

The Contractor shall take full responsibility for damaging any such service lines, utility/utility structure and any cost and/or expense that arises or issues from any such damage shall be borne directly by himself. Should any damage to any such service occur the Contractor shall forthwith take remedial action, initiate safety precautions, install temporary services and carryout repair all at his own cost and expense and inform the Engineer and notify all relevant authorities.

Existing utilities which are to remain in service or after the works are to be determined by the Contractor. If any existing service lines, utilities and utility structures which are to remain in service are uncovered or encountered

during these operations, they shall be safeguarded, protected from damage, and supported.

14. Plant and Equipment

The Contractor shall submit a detailed list of plant and equipment, which he shall undertake to bring to the site to carry out the work. The list shall satisfy the Engineer as to type, size and quantity. The list shall include for each piece of equipment the type, manufacturer, model, identification number and year of manufacture. The Contractor shall provide on the site of the work at his cost all of the equipment listed and all subsequent equipment required for approval of the detailed programme of work and such equipment which may be directed by the Engineer. The Contractor shall supply all plant and equipment necessary for the construction of each phase of the work and it must be on site, inspected and approved by the Engineer.

15. Construction Area and Access

The Contractor shall confine his operations to the areas that are actually required for the Works and shall fence the area accordingly. Arrangements for access roads, storage areas and routes for haulage of materials are to be made by the Contractor at his own cost, subject to the approval of the Engineer.

16. Storage & Handling Facilities

The Employer will provide the Contractor possible space within or nearby the area of site of works for the storage of plant, equipment and materials and for Contractor's temporary office, during the currency of the Contract. In case the adjacent area as required by the Contractor is not available within the Project boundary for storage of plant, equipment and machines then the Contractor shall arrange at his own expense possible space for storage of plant, equipment and machines at his own cost and expense. On no account shall such temporary installations conflict/ interfere with any of the permanent installations, services and any operational function of Employer. The handling and storage of all plants, equipment and materials at site shall be the sole responsibility of the Contractor and at no risk and cost to the Employer.

The Contractor shall protect all material against corrosion, mechanical damage or deterioration during storage and erection on site. The protection methods shall be to the approval of the Engineer.

17. Test Laboratory and Testing

17.1 Testing, except as otherwise specified herein, shall be performed by an approved testing agency as proposed by the Contractor and at no extra cost to the Employer. The Engineer may require all testing to be carried out under his supervision only.

17.2 If suitable and adequate material testing laboratory is not available in the vicinity, then the Contractor shall provide and maintain a materials testing laboratory in the vicinity of the Contractor's Camp and the laboratory shall have sufficient working area and shall be

equipped with all necessary facilities including a suitable store room.

- 17.3 The Contractor shall supply and maintain to the satisfaction of the Engineer or his representative complete testing equipment, apparatus, tools, gauges, instruments, etc. in sufficient number and adequate for all tests to be carried out as specified in these specifications. Valid calibration certificates of gauges instruments requirement shall be provided by the Contractor.
- 17.4 The Contractor, after the approval by the Engineer for the source of cement and steel "shall make available at the site sufficient stock of the materials in advance in order to allow sample testing for quality control prior to use.
- 17.5 The quality contract testing shall be performed" by the Contractor's competent personnel in accordance with a site testing and quality control program me to be established by the Contractor and approved by the Engineer or his Representative. The Contractor shall keep a complete record of all quality tests performed on site and submit the same to the Engineer. All quality control and related tests shall be carried out in accordance with applicable standards and codes.

18. Construction & Checking at Site

The Contractor shall submit to the Engineer in due time for approval and discussion, his proposals and plans as to the method and procedure to be adopted for the temporary and permanent works involved.

The submitting to these suggestions and arrangements, and the approval thereof by the Engineer shall not relieve the Contractor of his responsibilities and duties under the Contract.

The carrying out of all work included In the Contract is to be supervised by a sufficient number of qualified representatives of the Contractor and full facilities and assistance are to be afforded by the Contractor for the Engineer or his Representative to check & examine the execution of the work.

The Engineer reserves the right to inspect all parts of the works but may at his discretion waive inspection on certain items. This shall in no way absolve the Contractor from his responsibilities. This particularly applies to the checking of materials, the accurate setting out of foundations, and to the leveling, setting and aligning of the various parts, and to the proper fitting and adjustment of manufactured and finished materials and fixtures in position.

If the Engineer or his Representative find that the work progress is slow in such a way that the works or parts thereof will not be completed in the time specified, then he shall order the Contractor to work overtime or in shifts and the Contractor shall comply. These arrangements will be free of all financial encumbrances and at no additional costs to the Employer.

In the event of night work, the Contractor shall provide sufficient and adequate lighting to the satisfaction of the Engineer or his Representative and shall supply the necessary manpower for satisfactory continuation of the work after normal hours.

19. Bar Bending Schedule

Bar bending (reinforcement bars) schedule of all drawings shall be prepared by the Contractor and submitted to Consultants' Head Office for approval. The approved bar bending scheduled shall be followed for cutting of steel and preparation of bills.

20. Drawings

20.1 **Tender Drawings:** The drawings listed in the General Conditions of contract, Volume I and provided in Volume III are referred to as Tender Drawings and these show the scope of work to be performed by the Contractor. Tender Drawings shall not be used as a basis for fabrication or construction but may be used as a basis for placing preliminary order for materials, subject to corrections based on the future issue of Drawings as provided under sub-clause 19.2 Drawings Issued for Construction. Tender Drawings are subject to be modified and supplemented by additional detail by the Engineer.

20.2 **Drawings Issued for Construction:** After Award of Contract, Tender Drawings shall be replaced by Drawings Issued for Construction including supplementary Specifications as may be necessary. Such drawings and specifications shall be construed to be included in the expression Custody of Drawings under Sub-Clause 6.1 of General Conditions of Contract Part I. Drawings Issued for Construction may include some of the Tender Drawings with or without modification and additional drawings as required to express design intent in greater detail. Such drawings may also be modified from time to time. Drawings Issued for Construction will be the drawings from which shop, fabrication, erection installation, concrete placing, formwork, or other construction detail drawings shall be prepared by the Contractor. The work shall be executed in conformity with Drawings Issued for Construction. The Contractor shall prepare a schedule of Drawings Issued for Construction of various parts of the Works based on Construction programme approved by the Engineer for issuance to the Contractor from time to time.

20.3 **Study of Drawings:** The Contractor shall study all Drawings Issued for Construction carefully as soon as practicable after receipt thereof, and any errors discovered shall promptly be brought to the knowledge of the Engineer for his instructions.

20.4 **Copies of Drawing:** Drawings will be issued to the Contractor free of charge as follows:

Drawings Issued for Construction - Two copies as specified in sub-clause 6.1 Custody of Drawings, of General Conditions of Contract - Part I Volume I.

20.5 **Drawings to be furnished by the Contractor:**

Shop Drawings

All shop drawings required for the work including all kinds of

fabrication, field erection, installation, placement and layout drawings shall be furnished by the Contractor for approval of the Engineer. If additional detail drawings are necessary to complete any part of the work, such including reinforcing steel, drawings shall be prepared by the Contractor and submitted to the Engineer for approval. All drawings shall be complete and shall be submitted in due time and in logical order to facilitate proper coordination.

a. Lift and placement Drawings.

At least thirty calendar days prior to starting construction of any concrete lift or other placement, the Contractor shall submit lift or other placement drawings to the Engineer for approval. Lift or other placement drawings shall be submitted for each lift or other placement of concrete to be placed. These drawings shall be to such scale as to clearly show all recesses, openings, and embedded parts, including embedded structural steel, mechanical and electrical items, reinforcement placement in each lift in sufficient detail for proper execution of the work.

b. Construction Plant Layout Drawings.

Three prints of drawings, showing the layout of construction plant and equipment the Contractor proposes to use on the work, shall be submitted by the Contractor for review to the Engineer. The drawings shall show the locations of the principal components of the construction plant, offices, storage areas and yards which the Contractor proposes to construct or use at the site of the work and elsewhere. The drawings shall also show the unloading facilities for materials and equipment at the work site.

c. Submissions and Approvals:

Except as otherwise specified, three copies of each drawing for approval or review shall be furnished to the Consultant. Within thirty calendar days after receipt the Consultant will send one copy to the Contractor marked Approved, Approved/Except as Noted, or Returned for Correction. The notations Approved and Approved/Except as Noted will authorize the Contractor to proceed with the fabrication of the materials and equipment covered by such drawings subject to the corrections, if any, indicated thereon. Drawings returned for correction will be resubmitted for approval in the same manner as for new drawings. Every revision made during the life of the Contract shall be shown by number, date and subject in a revision block.

Upon receipt of prints which have been Approved or Approved Except as Noted, the Contractor shall furnish three prints plus one reproducible of each drawing to the Engineer. If revisions are made after a drawing has been approved, the Contractor shall furnish 3 additional prints and one reproducible subsequent to each approved revision.

d. Shop drawings to be prepared by a Sub-contractor shall be

submitted in the same manner as (a) & (b) above but they will be submitted through the Contractor.

- e. All of the applicable requirements of this Clause with reference to drawings to be prepared by the Contractor, including Subcontractors, shall apply equally to catalogue cuts, illustrations, printed specifications, or other data submitted for approval.

- f. Any work done on Contractor's drawings shall be at the Contractor's risk. The Engineer will have the right to request any additional details and to require the Contractor to make any changes in the drawings which are necessary to conform to the provisions and intent of design and specifications without additional cost to the Employer. The approval of the drawings by the Consultant shall not be construed as a complete check but will indicate only that the general method of construction and detailing is satisfactory. Approval by the Engineer of the Contractor's drawings shall not be held to relieve the Contractor of his obligation to meet all the requirements of the Specifications or of his responsibility for the correctness of the Contractor's drawings or of his responsibility for correct fit of assembled parts in final position or of his responsibility for the adequacy of method of construction.

21. As-Built Drawings

The Contractor shall, at all times, keep on the site one copy of all drawings and approved samples together with copies of all building, mechanical, electrical and public safety codes and relevant standards applicable to the works. All such material shall be made available to the Engineer.

In addition, the Contractor shall, at all times, keep on site a separate set of prints on which shall be noted neatly, accurately and promptly as the work progresses all significant changes between the work shown on the drawings and that which is actually constructed. The sub-Contractors shall each keep on site, at all times, a separate set of prints of the drawings showing their parts of the work on which shall be noted, neatly accurately and promptly as work progresses the exact physical location and configuration of the works as actually installed, including any revisions or deviation from the Contract Documents.

At the completion of the works, the Contractor shall at his expense, supply to the Engineer six copies and one reproducible copy of all drawings along with CD containing all as built drawings amended to comply with the work "As Built". The Contractor shall provide in the same format as the original drawings, any additional drawing required to record the work.

22. Restoration and Cleaning

The Contractor shall do regular cleaning and clean away all rubbish and excess materials that may accumulate from time to time on completion and before handing over. Upon completion of the works he shall obliterate all

signs of temporary construction facilities such as work areas, structures, foundations of temporary structures, stock piles of excess or waste materials, or any other vestiges of construction, unless otherwise directed by the Consultant/Engineer Incharge. The works and site shall be left in a clean and satisfactory state for immediate use and occupation. Care shall be taken not to use any cleaning materials which may cause damage to the surface to be cleaned.

23. Protection of the Works

The Contractor shall whenever necessary cover up and protect the works from Weather damage by his own or other workmen performing subsequent operation. He shall provide all necessary dust sheets, barriers and guard rails and clear away the same at completion.

The Contractor shall take all proper steps for protection at all places on or about the works which may be dangerous to his workmen or any other person or to traffic. The Contractor shall provide and maintain warning signs, warning lamps and barricades as necessary.

24. Product Data

Manufacture's standard schematic drawings shall be modified or deleted to indicate only information which is applicable to the project. Such standard information shall be supplemented to provide all additional applicable information.

Manufacturer's catalogue sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive literature shall be clearly marked to identify pertinent materials products or models. Dimensions and required clearances shall be indicated. Shop performance characteristics and capacities shall be noted.

25. Samples

25.1 The Contractor shall furnish for approval of the Engineer with reasonable Promptness all samples as directed by the Consultant or specifically called for in these Specifications. The Consultant shall check and approve such samples with reasonable promptness for compliance with the requirements of Contract Documents. All work shall be in accordance with approved samples.

25.2 Duplicate final approved samples, in addition to any required for the Contractor's use, shall be furnished to the Consultant, one for office use and the other for the Site.

25.3 Samples shall be furnished so as not to delay fabrication, allowing the Consultant/Engineer Incharge reasonable time for consideration of the sample' submitted.

25.4 Each sample shall be properly labeled with the name and quality of the material, manufacturers name, name of the project, the contractor's name and the date of submission, and the Specifications Article number to which the sample refers.

25.5 The manufacturer's installation directions shall be provided with each

sample. The Contractor shall pay all transportation costs and deliver samples to the Engineer's office & Consultants' Head office, Site or testing laboratory as directed by the Engineer. Samples will not be returned unless return is requested at the time of submission; all packing and transportation costs for the return of samples shall be paid by the Contractor.

25.6 Samples shall be of adequate size and number to permit proper evaluation of the material by the Consultant/Engineer Incharge. Where variations in colour, texture, dimensions or other characteristics are to be expected, the Contractor shall submit samples showing the maximum range of variation. Materials exceeding the range of variation of the approved samples shall not be used on the Work.

25.7 If both Shop Drawings and samples are required for the same item, the Consultant/Engineer Incharge may require both to be submitted before approving either,

25.7 No acceptance or approval of any Shop Drawings or sample, or any indication or directions by the Engineer on any Shop Drawings shall constitute an authorization for any increase in the Contract Sum.

In the event that the site cannot be connected to a local electricity network or where the available power is insufficient the Contractor has to make his own provision and maintain such installation.

A temporary lighting system shall be furnished, installed and maintained by the Contractor as required to satisfy the minimum requirements for safety and security. The temporary lighting system shall afford adequate general illumination to all building areas. Adequate outdoor lighting shall be provided to illuminate staging trenches and the like to the satisfaction of the Engineer Incharge and general illumination throughout adequate for watchmen and emergency personnel. .

Temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of governing codes. Temporary wiring shall be maintained in a safe manner and utilized so as not to constitute a hazard to persons or property.

When the permanent electrical power and lighting systems are in an operating condition, they may be used for temporary power and lighting for construction purposes provided that the Contractor obtains the written approval of the Client and assumes full responsibility for the entire power and lighting system and pays all charges/costs for operation and maintenance of the system mutually agreed between the Employer and the Contractor.

Approval, license etc. if required under local laws will be obtained by the Contractor on his own responsibility and cost. At completion of construction work, or at such time as the Contractor makes use of permanent electrical equipment and devices, temporary electricity services shall be removed by the Contractor as his own expense.

25.6.1 Waste Disposal

The Contractor shall make such temporary provisions as may be required in order to dispose of any chemicals, fuels, grease, bituminous materials, waste and soil waste and the like without causing pollution to either the site or the environment. Disposal of any materials, wastes, effluents, garbage, oil, grease, chemicals and the like shall be in areas specified by the concerned local authority proposed by the Contractor and subject to the approval of the Engineer. If any waste material is dumped in unauthorized areas the Contractor shall remove the material and restore the area to the condition of the adjacent undisturbed area. If necessary, contaminated ground shall be excavated, disposed off as directed by the Engineer In charge and replaced with suitable fill material compacted and finished with topsoil all at the expense of the Contractor.

25.6.2 Fire Protection

The Contractor shall provide and maintain adequate fire protection in the form of barrels of water with buckets, fire bucket tanks, fire extinguishers, or other effective means ready for instant use, distributed around the project and in and about temporary inflammable structures during construction of the works.

Gasoline and other flammable liquids shall be stored in and dispensed from safety containers approved by the Engineer In charge and storage shall not be within building.

Torch-cutting and welding operations performed by the Contractor shall have the approval of the Engineer In charge before such work is started and a chemical extinguisher is to be available at the location where such work is in progress.

The Contractor shall follow the instructions and specifications of the relevant department and or other local authority.

25.6.3 Telephone

The Contractor shall immediately after receiving the Letter of Acceptance take the necessary steps to obtain mobile and land line telephone on site. He shall be responsible for all installation and connection charges and periodic mobile and landline telephone accounts. The telephone shall be made available to the Engineer for the due performance of his duties at all times and free of charge during construction and defects liability period.

Deleted

26. Construction Schedule

A Construction schedule shall be maintained in accordance with the provisions of the General Conditions of Contract.

The schedule shall be accompanied with sufficient data and information including all necessary particulars of constructional plant, equipment

machinery, temporary Works, arrival of plant, equipment at site and their installation, method of operation, work forces employed, etc, for an activity of the Works.

Should the Consultant / Engineer consider any alteration or addition in the programme and time schedule, the Contractor shall conform thereto without any cost to the Employer.

Whenever necessary and wherever the progress of the actual work shows departure, the programme and time schedule shall be undated and submitted to the Consultant/Engineer In charge for his approval.

27. Notification to the Engineer

The Engineer's Representative shall be notified daily in writing of the nature and location of the Works the Contractor intends to perform the next day so as to enable necessary inspection and measurement to be carried out. The Engineer may, if necessary, direct that longer notice be given of certain operations.

28. Night Work

When work is done at night the Contractor shall maintain from sunset to sunrise such lights on or about his work and plant as the Engineer may deem necessary for the proper observations of the work and the efficient prosecution hereof.

29. Weather

No work is to be undertaken when, in the opinion of the Engineer, the weather is so unsuitable that proper protection of the work cannot be ensured.

30. Co-Ordination With Other Contractors

The Contractor shall make all necessary coordination with other Contractor and shall make sure that all embedding components such as pipes, steel bases etc. (as required for completion of electrical works) are properly, accurately and timely installed. The Contractor shall inform the other contractor the schedule of any construction activity well in advance giving him sufficient time to finish his part of job, before any compaction/concreting etc. The Contractor shall get the signature of the authorized representation of the other contractor before carrying out any construction activity.

If any part of electrical work is damaged or has to be dismantled or redone due to negligence omissions / incorrect position of the embedding etc. on part of the Contractor, all such losses/expensed shall be borne by the Contractor.

All expenses incurred for the above works including coordination are deemed to be covered in his tendered cost and no separate/extra payment shall be paid against such item.

31. Submission Requirements

- 31.1** Schedule submission at least sixty days before the dates when reviewed submittals will be needed.
- 31.2** Submit Shop Drawings as per provision given in Sub-Clause 20.5 (a) and number of copies of Product Data which the Contractor requires for distribution plus four copies which will be retained by the Engineer.
- 31.3** Submit three samples unless otherwise specified.
- 31.4** Accompany submittals with transmittal letter, in duplicate, containing: Date Project title and number Contractor's name and address The number of each Shop Drawing, Product Data and the Sample submitted. Notification of deviations from Contract Documents. Other pertinent data.

32. Resubmission Requirements Shop Drawings:

Revise initial drawings as required and resubmit as specified for initial submittal. Indicate on drawings any changes which have been made by the Engineer. Product Data and Samples: Submit new data and samples as required for initial submittal.

33. Survey Instruments

All the instruments, equipment, stakes and other material necessary to perform all work shall be provided by the Contractor. The survey work shall be carried out by competent staff consistent with the current practices. The Contractor shall maintain on site surveying instruments in perfect working conditions to enable the Engineer to check lines and level at all times.

Survey instruments and equipment shall include but not limit to the following: Electronic Total Station
Laser Meter
Precision Level invert Staff
Automatic Levels
Power level
Compass, steel tape, ranging poles

34. Weekly Progress Report and Photographs

- 34.1** During the continuance of the Contract, the Contractor shall submit weekly progress reports on forms as approved by the Consultant. Such weekly reports shall show the actual progress completed as of date of the report plotted against the schedule as given by the Contractor at the start of work and shall be broken down so as to indicate status of all activities associated - with mobilization design, material procurement, manufacture, surveys work, tests with regard to the agreed contract programme.

- 34.2** The Employer and the Engineer reserve the right to coordinate the

schedules of this Contractor and other Contractors working at the Site, and to adjust and/or change any and all such schedules as required during the course of construction in order to achieve a coordinated project in harmony with the Employer's completion date.

34.3 Commencing after the first week of construction, and continuing every week until completion, the Contractor shall take and submit photographs to the Engineer's Representative, to show progress of his work and completion of each structure or major feature.

35. Contractor to Notify Delays Etc.

Any delay which will affect the completion of Works shall be detailed by the Contractor who shall state the action he is taking for effective completion of the Contract programme. The Contractor shall submit a report in respect of the various sections of the Works, the equipment in use or held in readiness, 'a return of labour and supervisory staff, and details of any matters arising which may generally affect the progress of the work.

The Contractor shall give a summary of the detailed progress report giving the position with regard to the agreed Contract programme.

The progress reports shall be set out in a format to the approval of the Consultant, and forwarded promptly so that on receipt the information contained therein is not more than 21 days out of date.

If during execution of the Contract, the Employer considers the progress position of any section of the work to be unsatisfactory, or for any other reason relating to the Contract, he will be at liberty to convene a meeting and the Contractor's Representatives are to attend such meeting.

The Contractor's Site Office shall prepare and submit 6 copies of a weekly progress report to the Employer and Engineer's Site Office. This report shall summarize site activities and record and details where difficulties in maintaining the agreed programme are being experienced or are likely to cause subsequent delay.

The Contractor's Site Office shall also prepare and submit to the Engineer's Site Office 2 copies of Daily Activity Report summarizing the main activities to be undertaken each day, noting special activities such as tests, alignment checks, etc. The Contractor shall be responsible for expediting the delivery of all material and equipment to be provided by him and his subcontractors.

36. Photographs

As soon as work commences on Site, the Contractor shall provide photographs (at least 10 to 12) of the works from positions to be selected by the Engineer. Each photographic print shall not be less than 297 mm x 210 mm and shall bear a printed description, a serial number and the date when taken.

The negatives of all photographs shall be held at the Contractor's Site Office, numbered and handed over to the Employer at the completion of the Contract.

37. Facilities for the Engineer

37.1 Site Office

The Contractor shall construct, provide and maintain Consultant's Site Office of about 150-200 square ft covered area alongwith necessary furniture and fixtures No payment shall be made for the works involved within the scope of this section of specification.The cost thereof shall be deemed to have been included in the quoted unit rate of other items of the Bills of Quantities.

37.3 Contractor's Representatives

The contractor shall appoint experienced Project Manager and Site Engineer (Professional Engineers) registered with PEC and duly licenced who will be posted at the site of work for the execution of the work properly. Contractor will also appoint supervisor and surveyor at site

The contractor shall also have a responsible person permanently on the site during normal working hours who is capable of receiving, and acting upon, instructions received from the engineer and employers representatives

The contractor shall provide such assistance and supply such labours, materials and equipment as may be required by the Engineers representative and his staff to enable them to carry out their duties under the contract.

38 Security Passes

The contractor shall arrange security passes and identification cards for all his employees and those of his sub contractor from the University Security Department of the University

39. Visitors

The contractor shall not allow any visitor on site

SPECIAL CONDITIONS OF CONTRACT

1. Mobilization Advance

The Contractor will be entitled to Mobilization Advance as per the discretion of the Employer after the signing of Contract against as irrevocable bank guarantee of any schedule bank, valid and in full force from the date of issue of the bank guarantee up to the time of deduction of advance, have equaled the amount of guarantee. The advance will be given at the rate of ten percent (10%) of the Contract value in two stages 5% at each stage.

The advance will be recovered from the interim payment (Running Bill) of the Contractor at the rate of ten percent (10%) till the amount paid to the Contractor is fully adjusted. The mobilization period shall be two weeks from the date of receipt of letter of award to the Contractor by the Employer.

2. Shop Drawings

Where nature of work of Contract makes it necessary and where specifically required by these specifications and in particulars for doors, windows, ceilings, joinery, all finishes, plumbing, electrical, mechanical, roof drainage, gas, compressed air, A/C pipes and fittings and their installation etc. Contractor shall cause his materials vendors, fabricators or sub-contractors to submit scales and full size shop drawings of his work for approval of Consultant.

Shop Drawings must be complete in every detail including provisions required of various trades, connections with other work, all cutting, fitting and drilling required and any / all other necessary information in accordance with usual and customary trade practice as particularly required to be submitted to Consultants for approval.

It is to be understood that prior to manufacture, fabrication or installation of work under contract is carried forward, shop drawings shall be prepared and three copies of each drawing shall be submitted to the Consultants who will within two to three weeks after receipt thereof send one copy to the Contractor marked (I) "Approved", (II) "Approved Except as Noted" or (III) Returned for Correction". The notations approved and Approved Except as Noted shall authorize the Contractor to proceed with the fabrication of materials and equipment covered by such drawings subject to the correction, if any indicated thereon. When prints of drawings have been returned for correction the Contractor shall make the necessary revision on the drawings and shall re-submit prints for approval in the same manner as per new drawings. Every revision made during the life of the contract shall be shown by number, date and subject in a revision block.

So far as practicable, each drawing shall bear a cross reference note referring to sheet number or numbers of Consultants' drawings showing same work in order to facilitate checking of shop drawings in Consultants' Office and their prompt return to Contractor.

It is Contractor's obligation and responsibility to check and verify all dimensions and be fully responsible for them and for their coordination in connection with work. Contractor is responsible for submission of vendor's and / or fabricators shop drawings in proper rotation that is where the shop drawings of trade are dependent upon shop drawing of another trade, proper shop drawing shall be submitted first. No extension of time in respect to final completion date of work will be granted to Contractor because of failure to have any shop drawings in ample time to allow for checking and approval.

All shop drawings submitted by Contractor shall bear stamp of approval of Contractor as evidence that drawings have been checked by Contractor. Any drawings submitted without this stamp of approval will be considered as not having been submitted.

Each consignment of shop drawings submitted for approval must be accompanied by a letter of transmittal itemizing applicable work and number of the drawings. Each drawing must be marked with name of building and each series numbered consecutively for ready reference.

Contractor shall obtain all points from suppliers / manufacturers and others as necessary for construction purposes and the coordination of other trades and distribute them to all parties concerned.

No work being executed in any instance prior to approval by Consultants of any of respective shop drawings.

Consultants' approval, however, shall not relieve Contractor of responsibility for errors, as Consultants' approval of shop drawings is only general and is not intended to serve as a check and does not relieve Contractor from furnishing the materials and performing the work as required by drawings and specification.

3. As-Built Drawings

The Contractor shall at all times keep on the site one copy of all drawings and approved samples together with copies of all public safety codes and relevant standards applicable to the works. All such material shall be made available to the Engineer.

In addition, the Contractor shall, at all times, keep on site a separate set of prints on which shall be noted neatly, accurately and promptly site work progresses all insignificant changes between the work shown on the drawings and that which is actually constructed.

At the completion of works, the Contractor shall at his expense, supply to the Engineer six copies and two CD'S of all drawings amended to comply with work "As Built". The Contractor shall provide in the same format as the original drawings and additional drawing required to record the work.

4. Defective Work Noticed After Payment to the Contractor

If it shall appear to the Consultants that any work has been executed with unsound, imperfect or unskilled workmanship or with materials of any inferior description, or that any materials or articles, provided by the Contractor for the execution of the work are unsound or of a quality inferior to that contract or otherwise not in accordance with the Contract, the Contractor shall on demand in writing from the Consultants specifying the work, materials or articles completed of notwithstanding that the same may have been passed, certified and paid for, forthwith rectify or remove and reconstruct the work so specified in whole or in part, according to the requirement at his own charge and cost. No additional and extra payment will be made for this. In the event of his failing to do so, no payments shall be made for the same till the defect is rectified as per instruction of the Consultants and in cases where rectification or removal of defects or material is not possible and work can be accepted otherwise the rates for such items will be reduced, in such cases the decision of the Consultants will be final and binding on the Contractor.

5. Re-Measurement of Work

After checking of the bill by the Consultant, if at any stage it is observed that the measurements were wrong or doubtful then the same will be re-measured and the measurement corrected. The Contractor will be informed the date and time for joint measurement. If the Contractor or his representative does not attend, then the measurement taken by the Consultant will be taken as correct and final.

6. Contractors Representative / Agent

A competent agent registered with PEC as professional Engineer and duly authorized through a power Attorney whose qualifications and appointment shall be approved in writing by the Consultants [which approval may at any time can be withdrawn] is to be constantly on the works and shall give his whole time to the Superintendence of the same. If such approval shall be withdrawn by the Engineer the Contractor shall as soon as is practicable remove the Agent from

the site and shall not thereafter employ him again on the site in any capacity and shall promptly replace him by another agent approved by the Consultant. The agent shall receive on behalf of the Contractor directions and instructions from the Consultants or the representative of the Consultants. The approval by the Consultant of the qualifications and appointment of the Contractors' representative for Superintendence of the work shall not relieve the of the qualifications and appointment of the Contractors' representative for Superintendence of the work shall not relieve the Contractor of any of his duties or responsibilities under the contract.

7. Contractors Representative

The Engineer shall be at liberty to object to and require the Contractor to remove forthwith from the works any person provided by the Contractor who in the opinion of the Engineer, misconduct himself or is incompetent or negligent in the proper performance of his duties or whose presence on site is otherwise considered by the Engineer to be undesirable and such person shall not be again allowed upon the work. Any person so removed from the work shall be replaced as soon as possible.

8. Approved Manufacturers List

Materials as per specification of NHA shall be used.

9. Samples

Where required in specifications as otherwise required by the Consultant samples of items of fittings, hardware, electrical and mechanical materials etc; to be applied in the work, shall be submitted by Contractor for approval to the Consultant before the Contractor takes the work in hand.

Samples of all materials submitted for approval to the Consultant shall be supplied in triplicate, each sample bearing a neatly typed label bearing the Contractor's name, name of sub-contractor or producer of materials, kind, quality and finish or formula where applicable [as in the case of liquids or paints] intended to be used, in the project with date of submission. Written approval shall be obtained prior to processing or fabrication of any materials for which samples are submitted and all finished work shall conform to the characteristics of approved samples. In no instance shall approval of a sample relieve the Contractor of the responsibility for full compliance with any specification requirement.

The fact that materials have been accepted at shop or wherever the work is in preparation or progress shall not prevent its rejection under provisions hereof at the work sites either before or after installation. All samples shall be supplied by the Contractor at his own cost, for approval as directed.

Prior to the start of the application of any paint and or / finish treatment otherwise, the Contractor shall apply samples of the required finish treatment to specific representative walls and ceiling surface or other areas or surfaces where indicated by the Engineer representative. The size to be determined by the Engineer's representative / Client.

10. Insurance

The Contractor shall be responsible for obtaining a Contractors all risks policy from an insurance company acceptable to the Employer against risks to the works and shall make good at his own cost, all losses or damages whether to works themselves or to the lives, persons, whether under the Workmen's Compensation Act of Third Party Risk or property of others from whatsoever cause arising out of or in connection with the works either during the progress of the works or during the period of maintenance provided by this Contract.

The Contractor shall whenever required, produce to the Employer / Consultant the policy or policies of insurance and the receipt for the payment of the current premiums. All works together with material and plant for incorporation therein for which Contractor will be responsible under the terms of Contract. The insurance shall cover the period from the date of commencement until the date the final taking over certificate is signed, and shall also cover during the period of maintenance, loss or damage arising from a cause for which the Contractor is held responsible, whether the cause is detected prior to commencement of the period of maintenance.

Accident or Injury to Workmen

The Employer / Consultant shall not be liable for or in respect of any damages or compensation payable according to the provision of the Workmen's Compensation Act 1923 and any other laws in force in respect or in consequence of any accident, injury or death arising in connection with this contract to any workman or other person in the employment of the Contractor or any sub-contractor and the Contractor shall indemnify the Employer against all such damages, compensation, claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto.

NED UNIVERSITY OF ENGINEERING AND
TECHNOLOGY, KARACHI



TENDER DOCUMENT
FOR
CONSTRUCTION OF ACCESS ROAD AND
WALKWAYS TO GIRLS HOSTEL AT
NED UNIVERSITY

VOLUME - 2

TECHNICAL SPECIFICATIONS

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ITEM 101 CLEARING AND GRUBBING

101.1 DESCRIPTION

This work shall consist of removal to the specified depth, grubbing and disposal of all surface objects, as and where directed in writing by the Engineer, stumps, roots, bushes and trees with less than 150 mm girth, vegetation, logs, rubbish and other objectionable material except such objects as are designated to remain or are to be removed in accordance with other section of specification.

101.2 CONSTRUCTION REQUIREMENTS

101.2.1 Clearing / Grubbing

In roadway cut areas, all surface objects or any object to the depth of 30 Cm. below subgrade level such as stumps, roots, vegetation, bushes, logs, rubbish shall be cleared and / or grubbed as directed by the Engineer. In roadway fill areas where clearing and grubbing is required, same shall be carried out to the depth of 30 Cm below natural surface level as described above.

Operation of clearing and grubbing shall in no way be deemed of effect any level or volume change of the area.

After clearing and grubbing, the compaction of the area will be restored to its original value without any extra payment. However Engineer may direct in writing to the Contractor for stripping (if so required) under item 103 or for compaction under item 104, Compaction of Natural Ground, if the original compaction is less than the required for respective zone. Payment of these items will be made separately under the relative items used of such purpose.

Before bottom layer of embankment is placed, contractor will grub up and remove without extra payment, any vegetation that may, in the meantime have grown on surface previously cleared and grubbed.

All trees having girth less than 150 mm measured at (600) mm above ground and falling within the construction limits shall be felled & removed by the contractor. The excavation and removal of trees, roots and stumps including backfilling and compacting of holes and restoring the natural ground to the original condition shall be responsibility of the contractor for which no extra payment shall be made to him. The trees, stumps & roots remains the property of the Employer, which shall be delivered at designated place as directed by the Engineer.

101.2.2 Protection and Restoration

The Contractor shall prevent to all pipes, conduits, wires, cables or structure above or below ground. No land monuments, property markers, or official datum points shall be damaged or removed until the Employer / Engineer has witnessed or otherwise their locations and approved their removal. The Contractor shall so control his operations as to prevent damage to shrubs, which are to be preserved. Protection may include fences and boards latched to shrubs, to prevent damage from machine operations. Any damage as a result of contractor's operation shall immediately be rectified by him at his own expense.

101.3 MEASUREMENT AND PAYMENT**101.3.1 Measurement**

Clearing and grubbing will be measured for payment only on areas so designated in writing by the Engineer or shown on the drawings. The quantity to be paid for shall be number of square meters satisfactorily cleared and grubbed. Any tree having girth of less than 150 mm (measured 600 mm above ground level) shall be measured to be under this item.

Engineer shall ensure that a minimum of 500 SM area is designated for clearing and grubbing in any stretch of roadway for the sake of ease to construction activities.

Clearing and grubbing carried out by the Contractor in roadway cut areas and borrow pits shall be measured for payment.

101.3.2 Payment

The quantities determined as provided above will be paid for at the contract unit price for the pay item mentioned below and shown in the Bill of Quantities, which price and payment shall be full compensation for clearing and grubbing and restoration of area, to its original condition.

<u>Pay Item No.</u>	<u>Description</u>	<u>Unit of Measurement</u>
101	Clearing and Grubbing	SM

ITEM 102 REMOVAL OF TREES

102.1 DESCRIPTION

This work shall consist of the removal of trees and stumps alongwith their roots to a depth, to ensure complete removal of roots and stumps their disposal as provided in Special Provision or as directed in writing by the Engineer.

102.2 CONSTRUCTION REQUIREMENTS

Such individual trees as the Engineer may designate and mark in white paint shall be left standing uninjured. All other trees to be removed shall be counted and an inventory prepared showing girth of the tree stem.

When necessary to prevent injury to other trees or structures or to minimise danger to traffic, trees shall be cut in sections from top downwards.

Hole or loose earth resulting from the removal of trees shall be filled and recompacted to a degree of compaction of adjoining area. Any extra material required for such purpose shall not be measured for payment.

102.3 GENERAL REQUIREMENTS

Contractor shall prevent damage to all under-ground utilities, such as pipes cables or conduits etc. For this purpose if so required, removal of trees shall be carried out manually. Any under-ground or over-ground property damaged by the contractor shall be immediately repaired by the contractor at his own expense.

102.4 MEASUREMENT AND PAYMENT

102.4.1 Measurement

Engineer and Contractor shall jointly measure the girth and number of trees to be removed under this item. Any tree having a girth of less than 150 mm measured six hundred (600) mm above ground level shall be measured under this item, as the same shall be removed under item "Clearing and Grubbing".

102.4.2 Payment

The quantities determined as provided above shall be paid for at the contract unit price for the pay item mentioned below and shown in the Bill of Quantities which price shall be deemed to include all cost of labour equipment and incidental related to the item.

Pay Item	Description	Unit of
No.		Measurement
102a	Removal of trees, 150-300 mm girth	Each
102b	Removal of trees, 301-600 mm girth	Each
102c	Removal of trees, 601 mm or over girth	Each

ITEM 105 ROADWAY AND BORROW EXCAVATION FOR EMBANKMENT

105.1 DESCRIPTION

The work shall consist of excavating the roadway and borrow pits, removal and satisfactory disposal of all materials taken from within the limits of the work, also such excavation as is necessary for inlet and outlet ditches of structures and shall include all excavation, shaping and sloping for the construction, preparation of all embankment, subgrade, shoulders, intersections and approaches as directed and in conformity to the alignment, grade, level and cross-sections shown on the plans or established by the Engineer.

105.2 CLASSIFICATION OF EXCAVATION

105.2.1 Road Way Excavation

Roadway Excavation shall comprise all excavation that is not classified as structural excavation carried out within the limits of roadway including permanent drainage ditches and side slopes in cut.

Roadway Excavation shall further, be classified as "Common Excavation", or "Rock Excavation", (common excavation shall include all the materials of whatever nature encountered but not including rock excavation).

a) Common Excavation

Common excavation shall consist of the removal and satisfactory disposal of all eolian, alluvial and residual materials, in place unaltered and unweathered strata, which are not firm or rigid enough to possess all the characteristics of "Rock Excavation". Boulders of less than one quarter (1/4) cubic meter volume shall also be classified as "Common Excavation". Eolian and alluvial materials consist of gravel, shale, volcanic ash, loess, dunes and, loams, sands and clays or any combination of these materials, and termed as Common Excavation.

b) Rock Excavation

This includes firm and rigid igneous, metamorphic and sedimentary rocks. Boulders larger than quarter (1/4) cubic meter in volume will also be considered as "Rock Excavation", provided these are firm and stable lying in continuous bed and constitute more than 50% by volume as compared to other type of materials in the total mass.

The classification of Hard, Medium or Soft Rock shall be same as described under item 106.2 of General Specifications.

105.2.2 Borrow Excavation

Borrow Excavation shall comprise all excavation taken from borrow pits. Material from borrow pits shall normally be used for the construction of embankment or for the backfill when there is no material available from roadway excavation or structural excavation. Permission to use material from borrowpit shall first be obtained in writing from the Engineer. Nevertheless the total quantity of material from roadway excavation and structural excavation after deduction of the material declared unsuitable by the Engineer, shall be considered available for use in the work, and any material used from borrow pits for formation of embankment shall not be measured for payment.

In making his bid, the Contractor shall inspect the site and prepare his estimate of the haulage cost on the basis of his own survey of the possible nature and locations of the borrow pits. Their distance from the work sites shall not be grounds for extra payment or revision of the contract price.

The consent of the landowner or tenant for excavating the borrow material and hauling along private access roads shall be secured by the Contractor who shall, if required, pay for such concession. Borrow pits shall be left in a condition acceptable to the landowner and / or tenant and the Engineer.

105.2.3 Structural Excavation

The description method of measurement and payment of this section shall conform to as specified in item 107.

105.3 CONSTRUCTION REQUIREMENTS

All material removed from excavation shall be used in the formation of embankment, subgrade, shoulders, and at such other places as directed, unless it is declared unsuitable and ordered to waste by the Engineer. No excavated material shall be wasted without written permission from the Engineer, and when such material is to be wasted, it shall be so placed that it will present a neat appearance and not offer any danger to abutting property.

The material shall be declared unsuitable if the soaked CBR (96 hours) is less than five (5) percent or if fails under A-6 or A-7 of AASHTO soil classification.

During construction of the roadway, the road bed shall be maintained in such a condition that it will be well drained at all times.

All slopes, except in solid rock or other material shall be trimmed precisely as per cross-sections, and care must be exercised that no material shall be loosened beyond the required slopes. In blasting rock slopes, a reasonably uniform face shall be left, regardless of whether or not the excavation is carried beyond the specified side slope. All breakage and slides shall be removed by the contractor and disposed of as directed by the Engineer.

Rock, shale and other unsuitable road bed material encountered in cuts shall be excavated to required width and depth indicated on the plans or as otherwise directed. Any overbreakage below the depth shown on the plans will not be paid for. Backfill of the overcut shall be of approved earth material and shall have the same density requirements as specified on the plans and shall be at the expense of contractor.

Borrowpits shall be located so that the nearest edge of the pit is at least thirty (30) meters from the roadway toe of slope unless otherwise directed by the Engineer.

Permission to use any borrow material, including its suitability, shall be obtained in writing from the Engineer before execution of work. It is responsibility of the contractor to submit a request for test at least fifteen (15) working days prior to the day the contractor intends to begin taking material from the borrow area.

In no case shall borrow material be obtained from downstream of any hydraulic structure. However the borrowpit may be established at five hundred (500) meters upstream of the hydraulic structure. The side slopes of the pits or channels shall be constructed as shown on the plans or directed by the Engineer. In no case the side slopes of borrow pit be steeper than a slope; 1:5 (V:H).

Upon abandonment of borrow pit or quarry area, the contractor shall, at his own expense, clean and trim the borrow pit or quarry area, the right of way, and adjoining properties which were occupied during execution of work, all to the satisfaction of the Engineer.

All drilling and blasting shall be done in such a manner as will most nearly complete the excavation to the required grade line, and produce the least disturbance of the material to be left in place. Blasting by means of drill holes or any other methods shall be performed at the entire risk and responsibility of the contractor. Care shall be taken to ensure that no injury be done to persons or properties or to the finished work. Blasting shall be restricted to the hours prescribed by the local authorities or the Engineer.

Where between two successive cross-sections of the road, the properties of rock boulders, in sizes larger than a one quarter (1/4) of a cubic meter, to earth is more than 50%, the excavation will be considered wholly as rock.

Rock material above ground level such as stones, boulders, piles of stone, and dry stones walling whose individual sizes are greater than one quarter of a cubic meter shall be removed and disposed of if directed in writing by the Engineer and shall be paid under relevant item of work in the Bill of Quantities.

105.4 MEASUREMENT AND PAYMENT

105.4.1 Measurement

When the Bill of Quantities specifies for "Common Excavation", "Rock Excavation" and "Borrow Excavation" the quantities of the different classes of excavation shall be computed as follows:

a) Common Excavation

The unit of measurement for common excavation shall be in cubic meter and be computed by average end area method based on cross-sections duly approved by the Engineer prior to commencement and completion of required excavation.

The excavated material approved for fill under any item of the Bill of Quantities shall be used in the manner as described under the relevant item of work, irrespective of haulage distance.

b) Rock Excavation

Authorized "Rock Excavation" to be measured in cubic meters shall consist of area that is necessary to provide the design section and grade or as directed by the Engineer. Any over breakage beyond the lines shown on the plans and outside of the tolerances set for subgrade in cuts shall not be paid for. The Engineer shall define the beginning and ending points of areas classified as "Rock Excavation". Any area over excavated in the subgrade shall be reinstated at the cost of contractor as directed by the Engineer.

The pay quantity for "Rock Excavation" shall be computed by means of average end area method from approved cross-sections based on original ground elevations after the authorized removal of unsuitable or overburden materials, if required.

For disposal of excavated rock material, same procedure shall be followed as described above for the "Common Excavation" specified in sub item No.105.4.1 (a).

c) Borrow Excavation

No measurement shall be made for any Borrow Excavation, however this material if used in any of the Bill items, shall be measured and paid as provided under the relative items of work.

105.4.2 Payment

No payment for Roadway or Borrow Excavation shall be made under this item as the same is deemed to be included under relative item of Formation of Embankment.

ITEM 106 EXCAVATION OF UNSUITABLE OR SURPLUS MATERIAL

106.1 DESCRIPTION

The work shall consist of excavation and disposal of unsuitable or surplus material arising from roadway excavation, which is declared in writing by the Engineer to be unsuitable for use or surplus to the requirements of the project. When excavation of unsuitable material requires special attention for a known condition on a specific project, construction requirements and payment shall be covered under relevant Provisions.

106.2 CONSTRUCTION REQUIREMENTS

All suitable material excavated within the limits and scope of the project shall be used in the most effective manner for the formation of the embankment, for widening of roadway, for backfill, or for other work included in the contract.

Any material surplus to these requirement or any material declared in writing by the Engineer to be unsuitable shall be disposed of and levelled in thin layers by the Contractor outside the right of way within 7 Km of excavation. The Engineer shall decide regarding the unsuitability of the material by conducting appropriate laboratory tests.

When unsuitable materials are ordered to be removed and replaced, the soil left in place shall be compacted to a depth of twenty (20) cm to the density prescribed under Item 108.3.1. Payment for such compaction shall be included in the contract prices for the excavation materials.

If the unsuitable material, which is to be removed, is below standing water level and the replacement material is gravel or a similar self-draining material of at least thirty (30) cm in depth, the compaction may be dispensed with if approved by the Engineer.

Rock excavation shall be classified as under:

a) Hard Rock

Any rock which can not be removed with Ripper of a 200 H.P. Bulldozer and constitutes a firm and continuous bed of rock only.

b) Medium Rock

Any rock which can not be removed with the blade of 200 H.P. Bulldozer but can be removed by the ripper, will be termed as Medium Rock, irrespective of the fact that it is removed by blasting.

c) Soft Rock

Any rock which can be removed with the blade of a 200 H.P. Bulldozer. This item will be termed as Soft Rock, irrespective of the fact that it is removed by blasting.

106.3 MEASUREMENT AND PAYMENT

106.3.1 Measurement

When the contractor is directed to excavate unsuitable material below the surface of original ground in fill areas, the depth to which these unsuitable materials are to be removed will be determined by the Engineer. The contractor shall schedule his work in a such a way that authorized cross sections can be taken before and after the material has been removed. Only material which is surplus to the requirements of the project or is declared in writing by the Engineer to be unsuitable will qualify for payments under pay Item No. 106a, 106b, 106c, and 106d as the case may be.

The cost of excavation of material which is used anywhere in the project shall be deemed to be included in the pay Item relating to the part of the work where the material is used.

The under mentioned Pay Item Nos. 106a, 106b, 106c, and 106d shall include the cost of obtaining the consent of the owner or tenant of the land where the disposal of surplus or unsuitable material is made.

Unsuitable or surplus material shall be measured in its original position and its volume shall be calculated in cubic meters using end area method.

106.3.2 Payment

The quantities determined as provided above shall be paid for at the contract unit price respectively for each of the particular pay Items listed below and shown in the Bill of Quantities which prices and payment shall constitute full compensation for all costs involved in the proper completion of the work prescribed in this item.

Pay Item	Description	Unit of
No.		Measurement
106a	Excavate Unsuitable Common Material	CM
106b	Excavate Unsuitable Rock Material	
i.	Hard Rock	CM
ii.	Medium Rock	CM
iii.	Soft Rock	CM
106c	Excavate Surplus Common Material	CM
106d	Excavate Surplus Rock Material	
i.	Hard Rock	CM
ii.	Medium Rock	CM
iii.	Soft Rock	CM

ITEM 107 STRUCTURAL EXCAVATION AND BACKFILL

107.1 DESCRIPTION

Structural excavation shall include the removal of all material of whatever nature, necessary for the construction of foundations of bridges, culverts, retaining walls, headwalls, wing walls, catch basins, manholes, inlets and other structures not otherwise provided for in these specifications and in accordance with the plans or as directed by the Engineer. It shall include the furnishing of all necessary equipment and construction of all cribs, cofferdams, caissons, dewatering, sheeting, shoring etc., which may be necessary for the execution of the work. It shall also include the subsequent removal of cofferdams and cribs and the placement of all necessary backfill at hereinafter specified. It shall also include the disposing of excavated material, which is not required for backfill, in a manner and in locations so as not to affect the carrying capacity of any channel and not to be unsightly.

107.2 MATERIAL REQUIREMENT FOR BACKFILL

107.2.1 Backfill around structure

Backfill around structure shall be made with the following material.

- a. Granular backfill of selected material as specified here under
- b. Common backfill shall be carried out from excavated material or any other borrow material approved by the Engineer.

107.2.2 Grading backfill

Granular backfill material shall meet the following requirements.

a) Grading Requirement

<u>mm</u>	<u>Inch.</u>	<u>A</u>	<u>B</u>
25	V1	100	100
19	3 / 4"	60-100	75-100
4.75	No.4	50-85	55-100
2.0	No.10	40-70	40-100
0.425	NO.40	25-45	20-50
0.075	No.200	0-15	5-15

b) Material satisfying the requirements of coarse sand failing under soil classification A-3 (AASHTO). In case, coarse sand is utilised for granular fill it shall be ensured that the same is confined properly with approved material.

c) The material shall have a Plasticity Index of not more than size (6) as determined by AASHTO T-89 and T-90.

107.2.3 Common backfill

Use of excavated material as backfill may be allowed under this item. Use of borrow material for common backfill shall be allowed subject to approval of borrow material by the Engineer.

107.2.4 Rock backfill

Rock material of small size shall be permitted in the backfilling of structures or walls subject to the approval of methodology by the Engineer.

107.3 CONSTRUCTION REQUIREMENTS

107.3.1 Structural excavation

a) General

All substructures, where practicable, shall be constructed in open excavation and, where necessary, the excavation shall be shored, braced, or protected by cofferdams in accordance with approved methods. When footings can be placed in the dry without the use of cribs or cofferdams, backforms may be omitted with the approval of the Engineer, and the entire excavation filled with lean concrete to the required elevation of the top of the footing. The additional concrete shall be at the expense of the Contractor.

In case the contractor has excavated additional volumes than specified thereunder, the contractor shall at his own expense backfill the volume with approved material as directed by Engineer.

The classification of Hard, Medium or Soft Rock shall be same as described under item 106.2 of General Specifications.

b) Preservation of channel

Unless otherwise specified, no excavation shall be made outside of caissons, cribs, cofferdams, piling, or sheeting, and the natural stream bed adjacent to the structure shall not be disturbed without permission from the Engineer. If any excavation or dredging is made at the site of the structure before caissons, cribs or cofferdams are in place, the Contractor shall, without extra charge, after the foundation base is in place, backfill all such excavation to the original ground

surface or river bed with material approved by the Engineer. Material deposited within the stream area from foundation or other excavation or from filling of cofferdams shall be removed and the stream bed freed from obstruction thereby.

c) Depth of Footings

The elevation of the bottoms of footings, as shown on the drawings, shall be considered as approximate only and the Engineer may order, in writing, such changes in dimensions or elevation of footings as may be necessary to secure a satisfactory foundation.

d) Preparation of Foundations of Footings

- i) All rock or other hard foundation material shall be freed from all loose material, cleaned and cut to a firm surface, either levelled, stepped, or roughened, as may be directed by the Engineer.
- ii) When masonry is to rest on an excavated surface other than rock special care shall be taken not to disturb the bottom of the excavation, and the final levelling of the grade shall not be made until just before the masonry is to be placed.

e) Cofferdams and Cribs

- i). For substructure work, the contractor shall submit, upon request, drawings showing his proposed method of cofferdams construction and other details left open to his choice or not fully shown on the Engineer's drawings. The Contractor shall not start work until the Engineer has approved such drawings.
- ii). Cofferdams and cribs for foundation construction shall be carried to adequate depths and heights, be safely designed and constructed, and be made as water tight as is necessary for the proper performance of the work which must be done inside them. In general, the interior dimensions of cofferdams and cribs shall be such as to give sufficient clearance for the construction of forms and the inspection of their exteriors, and to permit pumping outside the forms. Cofferdams or cribs, which are tilted or moved laterally during the process of sinking, shall be righted, reset, or enlarged so as to provide the necessary clearance and this shall be solely at the expense of the Contractor.
- iii) When conditions are encountered which, in the opinion of the Engineer, render it impracticable to dewater the foundation before placing masonry, he may require the construction of a concrete foundation seal of such dimensions as may be necessary. The foundation water shall then be pumped out and the balance of the masonry placed in the dry. When weighted cribs are employed and the weight is utilized to partially overcome the hydrostatic pressure acting against the bottom of the foundation seal, special anchorage such as dowels or keys shall be provided to transfer the entire weight of the crib into the foundation seal. During the placing of a foundation

seal, the elevation of the water inside the cofferdam shall be controlled to prevent any flow through the seal, and if the cofferdam is to remain in place, it shall be vented or ported at low water level.

iv) Cofferdams or cribs shall be constructed so as to protect green concrete against damage from a sudden rising of the stream or river and to prevent damage to the foundation by erosion. No timber or bracing shall be left in cofferdams or cribs in such a way as to extend into the substructure masonry without written permission from the Engineer.

v) Unless otherwise provided, cofferdams or cribs with all sheeting and bracing shall be removed after the completion of the substructure, care being taken not to disturb or otherwise injure the finished masonry.

f) Pumping

i) Pumping from the interior of any foundation enclosure shall be done in such a manner as to preclude the possibility of the movement of water through any fresh concrete. No pumping of water will be permitted during the placing of concrete or for a period of at least twenty four (24) hours thereafter, unless it is done from a suitable sump pit separated from the concrete work by a watertight wall or other effective means.

ii) Pumping to unwater a sealed cofferdam shall not commence until the seal has set sufficiently to withstand the hydrostatic pressure.

g) Inspection

After each excavation is completed the Contractor shall notify the Engineer, and no concrete or masonry shall be placed until the Engineer has approved the depth of the excavation and the character of the foundation material.

In case if an existing structure is to be replaced with a new structure the quantities for dismantling the structure shall be paid under item 510 (Dismantling of structures) and additional excavation required shall be carried out under this item.

h) Classification of Excavation

Classification of excavation shall be made as described under items 106.2 of this Specification.

107.3.2 Excavation in Embankments

Unless otherwise specified, the Contractor may choose with the approval of the Engineer to excavate for structures, culverts, and pipe culverts after the embankment has been placed. Any space remaining after the placing of such structures or culverts shall be filled with material approved by the Engineer and compacted as follows:

Layers of not more than 20 cm in loose thickness shall be placed and compacted in succession, with mechanical tampers, plate compactors or hand guided rollers operated transversely to the roadway, to the densities specified in the item 108.3.1. Moisture content shall be adjusted as directed by the Engineer. Proper benching shall be made to ensure bonding of existing and new material without any extra payment.

The excavation in embankment and the placing of backfill for the purposes described above shall not constitute any claim for payment. also if sand or granular backfill is used by the contractor for his convenience, no extra payment will be made.

107.3.3 Backfill

a) Granular backfill where-ever directed shall be placed in the position and in the required depth, shown on the drawings or where and as required in writing by the Engineer and it shall be well compacted in layers not exceeding twenty (20) cm in thickness to 100 percent of Max. dry density as per AASHTO T-180 (D). In case of water logged areas the thickness of the layer shall not exceed fifty (50) centimeters or as directed by the Engineer. Volume of granular fill around structures shall be calculated within the vertical limits of approved 'excavation for such a structure, where as the horizontal limits shall be those as specified on drawings.

b) Common backfill shall consist of earth free from large lumps, wood and other organic materials and of a quality acceptable to the Engineer. It shall be placed in the position and to the required depths shown on the Drawings and / or as required in writing by the Engineer and it shall be well compacted in layers not to exceed twenty (20) cms in depth to the density, 95 percent of maximum dry density, as per AASHTO T- 80 (D).

c) The rock backfill material whose individual sizes are not more than 30 cm shall be placed in the position to the required depth as specified and the voids shall be filled in layer of fine material approved by the Engineer. The compacting efforts shall be made so as to achieve the desired compaction approved visually by the Engineer. The depth of the layer in any case shall not exceed sixty (60) centimeters. However in water logged areas, the thickness may be increased

as directed by the Engineer. Rock backfill will not be placed within two meters from concrete face of any structure.

d) All spaces excavated and not occupied by abutments, piers or other permanent work shall be refilled with earth or granular fill as approved by the Engineer up to the surface of the surrounding ground, with a sufficient allowance for settlement. All such backfill shall be thoroughly compacted and, in general, its top surface shall be neatly graded.

e) The fill behind abutments and wing walls of all bridge structures shall be deposited in well-compacted, horizontal layers not to exceed twenty (20) cm. in thickness. The common backfill in front of such units shall be placed first to prevent the possibility of forward movement.

Special precautions shall be taken to prevent any wedging action against the masonry, and the slope bounding the excavation for abutments and wingwalls shall be destroyed by stepping or roughening to prevent wedge action. Jetting of the fill behind abutments and wingwalls will not be permitted.

f) Fill placed around culverts and piers shall be deposited on both sides to approximately the same elevation at the same time. Where the Contractor does not have proper equipments to ensure compaction in restricted areas, Engineer may allow backfill with sand saturation method, at no extra cost to the Client.

g) Adequate provision shall be made for the through drainage of all backfill. French drains shall be placed as weep holes.

h) No backfill shall be placed against concrete or masonry structure before fourteen (14) days of placement and backfilling shall be carried out on both sides of the structure simultaneously.

107.4 MEASUREMENT AND PAYMENT

107.4.1 Measurement

a) Structural Excavation

The quantities of structural excavation to be paid for shall be the number of cubic meters of material measured in its original position computed by the average end-area method, and excavated to the satisfaction of the Engineer.

Structural Excavation will be classified for measurement and payment as "Structural Excavation in Common Material", "Structural Excavation in Common Material Below Water Level", "Structural Excavation in Rock Material" and according to whether the excavation is in earth or

rock and according to whether the excavation is above or below the water level which is the constant level to which the water naturally rises in a foundation pit.

The volume of earth or rock to be measured for structural excavation shall consist of a prismoid bounded by the following planes:-

- 1) The vertical limits for computing pay quantities will be vertical planes 50 centimeters outside of the neat lines of footings or foundations as shown on the Drawings or as directed by the Engineer.
- 2) The upper limit for payment of structural excavation shall be the ground surface as it existed prior to the start of construction operations, except where structural excavation is performed within roadway excavation or ditch excavation areas, the upper limit shall be the planes of the bottom and side slopes of said excavated areas.
- 3) The lower limits for computing pay quantities of structural excavation or structure backfill shall be a plane at the bottom of the completed footings, foundations, structures or lean concrete.

Measurement for structural excavation shall not include material removed below the footing grade and beyond specific limits to compensate for anticipated swell or as a result of effective swell during pile driving, or additional material resulting from slides, slips, cave-ins, silting or fillings, whether due to the action of the elements or to carelessness of the Contractor. The depths of the footings shown on the drawings are approximate only and any variation found to be necessary during construction shall be paid for at the contract unit price.

b) Granular Backfill

The quantities of Granular Backfill to be paid for shall be the number of cubic meters of material laid and compacted in place within the fine of structure and limits defined in Item 107.4.1 (a) above, computed and accepted by the Engineer.

c) Common Backfill

The quantities of Common Backfill to be paid for shall be the number of cubic meters of material laid and compacted, placed within the lines of structure and limits defined in Item 107.4.1(a) above and accepted by the Engineer.

107.4.2 Payment

The quantities determined as provided above shall be paid for at the contract unit price respectively for each of the particular pay item listed below that is shown in the Bill of Quantities, which price and payment shall be full compensation for all the costs involved in the proper completion of the work prescribed in this item.

Pay Item	Description	Unit of	
No.			Measurement
107a	Excavate Excavation in Common Material	CM	
107b	Excavate Excavation in Common Material Below Water Level	CM	
107c	Excavate Excavation in Rock Material	CM	
i.	Hard Rock	CM	
ii.	Medium Rock	CM	
iii.	Soft Rock	CM	
107d	Granular Backfill Type-	CM	
107e	Common Backfill	CM	

ITEM 209 SCARIFICATION OF EXISTING ROAD/BREAKING OF ROAD PAVEMENT STRUCTURE

209.1 DESCRIPTION

This item shall consist of scarification of existing road surface or breaking of existing road pavement structure to ensure bondage of new layer with the existing road pavement and to ensure drainage of water below the surface of freshly laid aggregate base. The surface on which the base material is to be constructed shall be approved and accepted by the Engineer prior to placing the crushed stone base aggregate.

209.2 CONSTRUCTION REQUIREMENTS

The method of scarification of road surface or breaking of pavement structure shall be proposed by the contractor and approved by the Engineer, in accordance with the requirements under site conditions.

After the existing pavement structure has been broken off, the material shall be removed and disposed off outside the right of way, according to the satisfaction of the Engineer. The surface obtained after scarification or breaking the existing pavement shall be compacted to the density prescribed under item 108.3. 1. Payment of such compaction shall be included in the contract price for item 209.

209.3 MEASUREMENT AND PAYMENT

209.3.1 Measurement

The quantity for road pavement structure broken and removed, to be paid for shall be measurement in Cu. meter to a depth as shown in the drawings/cross sections or as specified by the Engineer and in the area earmarked by the Engineer for such purpose.

The quantity for road pavement structure scarified, to be paid for shall be measured in Sq. meter as shown in the drawings/cross sections or as specified by the Engineer and in the area earmarked by the Engineer for such purpose.

209.3.2 Payment

The quantities as measured above shall be paid for at the contract unit price per Cu. meter of breaking of road pavement structure and per Sq. meter of scarification of existing road pavement structure, for carrying out the works mentioned above including cost of labour, equipment, tools and incidental necessary to complete these items.

<u>Pay Item No.</u>	<u>Description</u>	<u>Unit of Measurement</u>
209a	Breaking of Existing Road Pavement Structure .	CM
209b	Scarification of Existing Road Pavement .	SM

ITEM 510 DISMANTLING OF STRUCTURES & OBSTRUCTIONS

510.1 DESCRIPTION

This work shall consist of dismantling, removal, wholly or in part and satisfactory disposal of broken material from buildings, fences, bridges, culverts, drainage facilities at different locations and any other obstructions which are not designated or permitted to remain on those sections of existing highways except for the obstructions to be removed and disposed of under other items in the contract. It shall also include the salvaging of designated materials and backfilling the resulting trenches, holes, pits and ditches.

510.2 CONSTRUCTION REQUIREMENTS**General**

Engineer shall specify the extent of dismantling for each structure and the contractor shall raze, remove and dispose of all remains of all those dismantled structures and other obstructions any portion of which are on the right of way, except utilities and those for which other provisions have been made for removal. All designated useable material shall be removed, without unnecessary damage, in sections or pieces, which may be readily transported, and shall be stored by the contractor at specified places within the project limits. Unusable perishable material shall be destroyed. Nonperishable material may be disposed of outside the limits of view from the project with written permissions of the property owner on whose property the material is placed. Copies of all agreements with property owners are to be furnished to the Engineer. Basements or cavities left by structural removal shall be filled to the level of the surrounding ground and, if within the prism of construction shall be compacted to the required degree of compaction designated on the plans for roadway embankment and as specified in Item 108.3.1.

Salvaged pipe culverts or other structures shall be stored at designated and accessible points on the project as approved by the Engineer and shall be the property of the client. Dismantling shall be carried out either manually or with approved equipment&-. Structures to be dismantled may include plain or reinforced concrete, brick, stone masonry or any other such construction item.

510.2.1**Removal of Bridges, Culverts and other Drainage Structures**

Concrete Bridges, culverts and other drainage structures in use by traffic; shall not be removed until satisfactory arrangements have been made to accommodate traffic. Unless otherwise directed, the sub-structures of existing structures shall be removed down to the natural stream bottom and those parts outside of the stream shall be removed thirty (30) centimeters below ground surface. Where such portions of existing structures are wholly or in part within the limits for a new structure, they shall be removed as necessary to accommodate the construction of the proposed structure. Steel bridges and wood bridges as designated on the plans, shall be carefully dismantled without unnecessary damage. Steel members shall be match marked, unless such match marking is waived by the Engineer. All -salvaged material shall be stored as previously specified.

Blasting or other operations necessary for the removal or dismantling of an existing structure or obstruction, which may damage new construction, shall be completed prior to placing the new work.

510.2.2**Removal of Pipes**

Unless otherwise directed all pipes shall be carefully removed and every precaution taken to avoid breaking or damaging the pipe. The contractor shall be held responsible for the satisfactory removal of such structures in a usable condition. In case these provisions are violated, due to the Contractor's negligence, all material to be salvaged which is damaged in dismantling 1 removal to impair its future use will be charged to the contractor at sixty (60) percent of the current quoted price, delivered to the project, of an equal amount of new material. This amount of money shall be deducted from any money due or to become due to contractor.

510.2.3**Fences, Boulders, Stone Piles**

Stones, fences, piles of stones or boulders of size greater than one-sixth-quarter (114) cubic meter in volume which lie within the limits of the work as shown on the plans, or which fall within the approved cross sections shall be removed and disposed of as directed.

When fences enclosing pasture land or farm land are to be removed, the Contractor shall notify the property owner sufficiently in advance to permit the owner reasonable time to construct supplemental fences or make other arrangements.

510.2.4

Wells

Existing wells, abandoned or active, which lie within the limits of the Work as shown on the plans, or which fall within the approved cross sections or as directed by the Engineer shall be dismantled, backfilled and compacted. The Contractor shall carefully remove all salvageable material and store it at a location on site designated by the Engineer. Unless otherwise noted or directed, all salvageable material shall become the property of the Client. Wells shall be filled to the level of the surrounding ground and, if within the prism of construction, shall be compacted to the type of compaction within the moisture range designated on the plans for roadway embankment and as specified in Item 107. No dismantling or backfilling of a well shall be done by the Contractor without the prior approval of the Engineer. No separate payment for dismantling or backfilling wells shall be made, the costs being considered subsidiary to other items listed in the Bill of Quantities, except that the compacted backfill required for wells will be paid for as per applicable item of backfill material.

510.3

MEASUREMENT AND PAYMENT

510.3.1

Measurement

The quantity of dismantling the structure to be paid for shall be measured in cubic meter of structure dismantled. All such measurements shall be agreed by the Engineer and the Contractor before the dismantling work starts. Necessary shop drawings will be prepared by the contractor for such purpose.

510.3.2

Payment

The quantity as measured above shall be paid for at the Contract price per cubic meter. The payment shall constitute full compensation for dismantling, removal and disposal of material as directed by the Engineer and for all labour, equipments, tools and incidentals necessary to complete the work.

Pay Item No.	Description	Unit of Measurement
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510	Dismantling of Structures and Obstructions.	CM
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ITEM 104 COMPACTION OF NATURAL GROUND

104.1 DESCRIPTION

The natural ground or surface ready for construction purposes after clearing and grubbing, or stripping, (if required) will be considered as (natural) Ground for the purpose of this item. The compaction of natural ground shall be carried out through a written order by the Engineer.

104.2 CONSTRUCTION REQUIREMENTS

Up to a depth of twenty (20) cm below the natural ground, all sods and vegetable matters shall be removed and clear surface shall be broken up by ploughing and scarifying to compact to the degree as defined below:-

For height of Embankment Percent of Maximum Dry Density

below sub grade level. as determined by AASHTO T-180.*

0 to 30 cm 95

30 to 75 cm 93

Over 75 cm 90

Below the foundation of structures 95

104.2.1 Compaction of original ground surface in areas of high water levels and salinity

Compaction of the natural ground surface in such areas will be difficult if not impossible. See Items 108, etc. under Formation of Embankment for construction requirements under these conditions, where compaction of Natural Ground shall not be carried out.

104.3 MEASUREMENT AND PAYMENT

104.3.1 Measurement

The measurement shall be made by multiplying the length and breadth of the area approved in writing by the Engineer to be paid under this item. The measurement of the item shall be in Square meter.

Any subsidence of levels of Natural Ground due to compaction under this item shall not be measured for payment, the contractor is expected to take care of such factors while bidding.

104.3.2 Payment

The payment under this item shall be made for at the contract unit price for Square meter of compaction of (natural) ground measured as above and shall be deemed to include cost of scarification, watering, mixing, levelling, rolling, labour, equipment, tools, and incidentals necessary to complete this item.

Pay Item	Description	Unit of
<u>No.</u>		<u>Measurement</u>
104	Compaction of Natural Ground	SM

ITEM 202 AGGREGATE BASE COURSE

202.1 DESCRIPTION

This item shall consist of furnishing, spreading and compacting one (1) or more layers of aggregate base on a prepared subgrade, subbase, or existing road surface, in accordance with the specifications and the drawings and / or as directed by the Engineer.

202.2 MATERIAL REQUIREMENTS

Material for aggregate base course shall consist of crushed hard durable gravel, rock or stone fragments. It shall be clean and free from organic matters, lumps of clay and other deleterious substances. The material shall be of such a nature that it can be compacted readily under watering and rolling to form a firm, stable base for both flexible and rigid pavements.

The aggregate base shall comply to the following grading and quality requirements.

a) The gradation curve of the material shall be smooth and within the envelope limits for Grading A or B given below.

Grading Requirement for Aggregate Base Material			
Sieve Designation		Mass Percent Passing Grading	
mm	Inch	A	B
50.000	2	100	100
25.000	1	70-95	75-95
9.500	3/8	30-65	40-75
4.750	No.4	25-55	30-60
2.000	No.10	15-40	20-50
0.425	No.40	8-20	12-25
0.075	No.200	2-8	5-10

The material shall be well graded such that the coefficient of Uniformity D60/D10 shall be greater than four (4).

- b) Crushed Aggregate (material retained on sieve NO. 4) shall consist of material of which at least ninety (90) percent by weight shall be crushed particles, having a minimum of two (2) fractured faces.
- c) The Coarse aggregate shall have a percentage of wear by the Loss Angeles Abrasion test (AASHTO T-96) of not more than forty (40).
- d) The material shall have a loss of less than twelve (12) percent when subjected to five cycles of the Sodium Sulphate Soundness test according to AASHTO T-104.
- e) The sand equivalent determined according to AASHTO T-176 shall not be less than 45 and the material shall have a Liquid limit of not more than twenty five (25) and a plasticity Index of not more than 6 as determined by AASHTO T-89 and T-90.
- f) The material passing the 19 mm sieve shall have a CBR value of minimum eighty (80) percent, tested according to the AASHTO T 193. The CBR value shall be obtained at the maximum dry density determined according to AASHTO T 180, Method D.
- g) Laminated material shall not exceed 15% of total volume of Aggregate Base Course.

202.2.1 Filler for Blending

If filler, in addition to that naturally present in the aggregate base material is necessary for meeting the grading requirement or for satisfactory bonding of the material, it shall be uniformly blended with the base course material at the crushing plant or in a pugmill unless otherwise approved. The material for such purpose shall be obtained from sources approved by the Engineer. The material shall be free from organic matter, dirt, shale, clay and clay lump or other deleterious matter and shall conform to following requirement.

AASHTO Sieve	Percent Passing
3/8 Inch	100
4	85-100
100	10-30
Plasticity Index (AASHTO T-90)	6 maximum
Sand Equivalent (AASHTO T-176)	30 minimum

However the combined aggregates prepared by mixing the coarse material and filler shall satisfy the requirements as mentioned in clause 202.2 above.

202.3 CONSTRUCTION REQUIREMENTS

202.3.1 Preparation of surface for Aggregate base course

In case crushed aggregate base is to be laid over prepared sub base course, the subbase course shall not have loose material or moisture in excess to optimum moisture content.

Spreading shall conform in all respects to the requirements specified under this heading in Item 201 - Subbase (201.3.1).

202.3.2 Compaction

Compaction process shall conform in all respect to the requirements specified under this heading in Item 201 (201.3.3).

202.3.3 Compaction Requirement

The relative compaction of each layer of the compacted base shall not be less than 100 percent to the maximum dry density determined according to AASHTO T-1 80, Method D (Modified). The field density shall be determined according to AASHTO T-191 or other approved method. For all materials, the field density thus obtained shall be adjusted to account for oversize particles (retained on 19 mm sieve) as directed by the Engineer. Also for adjustment of any material retained on 4.75 mm sieve, AASHTO Method T224 shall be used

Completed base course shall be maintained in an acceptable condition at all times until prime coat is applied. When base course is to carry traffic for an indefinite length of time before receiving surfacing, the contractor shall maintain the surface until final acceptance and shall prevent revelling by wetting, blading, rolling and addition of fines as may be required to keep the base tightly bound and leave a slight excess of material over the entire surface which must be removed and the surface finish restored before application of prime coat.

202.3.4 Moisture Content Determination

Moisture content determination shall conform in all respects to the requirements specified under clause 201.3.5 for subbase.

202.3.5 Trial Sections

Prior to commencement of aggregate base course operations, a trial section of two hundred (200) meters minimum, but not to exceed five hundred (500) meters shall be prepared by the contractor using same material and equipment as will be used at site to determine the adequacy of equipment, loose depth measurement necessary to result in the specified compacted layer depths, field moisture content, and relationship between the number of compaction passes and the resulting density of material. For details refer to clause 1.20 (General) of these specifications.

202.3.6 Tolerance

The completed base course shall be tested for required thickness and smoothness before acceptance. Any area having waves, irregularities in excess of one (1) cm in three (3) M or two (2) cm in fifteen (15) M shall be corrected by scarifying the surface, adding approved material, reshaping, recompacting and finishing as specified. Skin patching of an area without scarifying the surface to permit proper bonding of added material shall not be permitted. The allowable tolerances shall be according to the "Table for Allowable Tolerances" in these specifications.

202.3.7 Acceptance, Sampling and Testing

Acceptance of sampling and testing with respect to materials and construction requirements shall be governed by the relevant, "Table for Sampling and Testing Frequency" or as approved by the Engineer.

202.4 MEASUREMENT AND PAYMENT**202.4.1 Measurement**

The quantity of aggregate base to be paid for, shall be measured by the theoretical volume in place as shown on the drawings or as directed and approved for construction by the Engineer, placed and accepted in the completed crushed aggregate base course. No allowance will be given for materials placed outside the theoretical limits as shown on the cross sections.

202.4.2 Payment

The accepted quantities measured as above shall be paid for at the contract unit price per cubic meter of aggregate base, for the item listed below and shown in the Bill of Quantities, which price and payment shall constitute full compensation for furnishing all materials, hauling, placing, watering, rolling, labour, equipment, tools and incidentals necessary to complete this item.

Pay Item	Description	Unit of
No.		Measurement
202	Aggregate Base	CM

ITEM 601 CONCRETE KERBS, GUTTERS AND CHANNELS

601.1 DESCRIPTION

This work shall consist of kerb, gutter, channel, or combination of kerb and gutter or channel; constructed of the following materials and in accordance with the specifications at the location and of the form, dimensions and designs shown on the Drawings or as directed by the Engineer. The kerb, gutter, channel or in combination may be constructed by one of the following methods.

- i) Cast in place concrete kerbing.
- ii) Precast concrete kerbing.
- iii) Extruded concrete kerbing.

601.2 MATERIAL REQUIREMENTS

The concrete for cast in place concrete kerbs, gutters and channels shall be either Class W or class 'C' or as indicated on the Drawings and shall conform to the requirements of that particular class prescribed under item 401.1.1. "Classes of concrete". An air entraining agent, if required, shall be added during mixing an amount to produce five (5) to eight (8) percent air by volume in the mixed concrete.

Precast concrete kerbing units shall consist of class 'C' concrete conforming to the requirement of item 401 and to lengths, shape and other details shown on the Drawings. Kerbing which shows surface irregularities of more than five (5) mm when checked with three meter straight edge or surface pits more than fifteen (15) mm in diameter will be rejected.

Forms to hold the concrete shall be built and set in place as described under item 403-Formwork.

Forms for at least sixty meters of kerb or combination of kerb and gutter or channels shall be in place and checked for alignment and grade before concrete is placed. Curved sections shall have forms of either wood or metal and shall be accurately shaped to radius of curvature shown on the Drawings. Steel Reinforcement if required shall conform to item 404 "Steel Reinforcement".

Expansion joint filler shall be either the performed type conforming to requirement of AASHTO-M 153 or shall be precast fiber board packing.

Joint filler shall consist of one part cement and two parts of approved sand with sufficient quantity of water necessary to obtain the required consistency. The mortar shall be used within thirty (30) minutes after preparation.

The Bonding compound when used shall conform to AASHTO M-200.

601.3 CONSTRUCTION REQUIREMENTS

601.3.1 Cast-in-Place

a) Excavation and Bedding

Excavation shall be made to the required depth and the base upon which the kerb or combination of kerb and gutter is to be set shall be compacted to a minimum density of ninety (90) percent of the maximum dry density as determined by AASHTO T-191 Method. All soft and unsuitable material shall be removed and replaced with suitable material acceptable to the Engineer.

Where directed by the Engineer, a layer of cinders or clean sand and gravel, or other approved porous material having a minimum compacted thickness, of fifteen (15) cm shall be placed to form a bed for the kerb or combination of kerb and gutter.

b) Placing Concrete

Concrete may be placed in the gutter to the full depth required. The top of the kerb or combination of kerb and gutter shall be floated smooth and the edges rounded to the radii shown on the Drawings. Before finishing, the surface of the gutter shall be tested with a three (3) meter straight-edge and any irregularities of more than five (5) mm in three (3) meters shall be eliminated. In finishing concrete only mortar normally present in the concrete shall be permitted for finishing. The use of a separate mortar finishing coat or the practice of working dry cement into the surface of the concrete will not be permitted.

c) **Joints**

The kerb and gutter shall be constructed in uniform sections of not more than twenty five (25) meters in length except where shorter sections are required to coincide with the location of weakened planes or contraction joints of the concrete pavement or for closures but no section shall be less than two (2) meters long. The sections shall be separated by sheet templates set perpendicular to the face and top of the kerb and gutter. The templates shall be approximately five (5) mm in thickness, of the same width as that of the kerb or kerb and gutter and not less than five (5) cm greater than the depth of the kerb or kerb and gutter. Templates shall be set carefully and held firmly during the placing of the concrete and shall be allowed to remain in place until the concrete has set sufficiently to hold its shape, but shall be removed while the forms are still in place. When pre-cut fiber-board packing is used in the expansion joints it may be used in place of the sheet template referred to above, on the approval of the Engineer. In this event the fiber board shall be pre-cut to the shape of the kerb so that its outer edge will be flush with the abutting kerb.

Expansion joints shall be formed in the kerb and gutter at intervals of six (6) to ten (10) meters in order to coincide with the expansion joints of cement concrete pavement or as shown on the Drawing.

d) **Dowels at Expansion Joints in Channels**

At expansion joints in channels and in the channel portion of kerbs and channel built monolithically, painted dowel bars with slip sleeve shall be provided as a load transfer medium at locations shown on the Drawings.

The size and spacing of the dowel bars shall be as indicated on the Drawings. Each dowel shall be set accurately parallel to the top surface of the gutter and accurately at right angles to the expansion joint.

e) Contraction Joints

Transverse contraction joints shall be provided opposite to all contraction joints in abutting concrete pavement and other locations shown on the Drawing spaced to a maximum of four (4) meters.

The contraction joints shall be provided by forming grooves in the face and surface of structure at right angle to the kerb alignment and kerb surface. The grooves shall be rectangular in cross-section, five (5) cm deep by five (5) cm wide. The grooves shall be formed in the top of all kerbs and in the exposed roadway face of kerb and in the channel surface of monolithic type kerb and channels and in the surface of channels. The edges of the joints shall be tooled and the joints shall be left clean, neat and of specified width and depth.

f) Removal of Forms and Finishing

The forms shall be removed within twenty four (24) hours after concrete has placed except that the, form used against the face of the kerb in a combination of kerb and gutter shall be removed as soon as the concrete has set sufficiently to hold its shape. Minor defects shall be repaired with mortar containing one part of portland cement and two parts of the fine aggregate. Plastering shall not be permitted on the face of a kerb or kerb and gutter and all rejected kerb or gutter shall be removed and replaced without additional compensation. All surfaces which will be exposed in the finished construction of the kerb and gutter shall be finished, while the concrete is still "green" by wetting a wood block of float and rubbing the surface until they are smooth.

g) Curing

During seventy two (72) hours following placing of concrete, the kerbs, channels and gutters shall be protected against premature drying by covering with suitable cotton or Hessian mats and by frequent sprinkling with water, with liquid forming compounds or with waterproof paper or by any other method as mentioned in section 401.3.8-Curing, Concrete and approved by the Engineer.

h) Backfilling

After forms has been removed and concrete has been cured as specified, the excavation of kerbs, gutters or channels shall be backfilled with suitable earth or granular material tamped into place in layers of not more than fifteen (15) cms each until firm and solid.

601.3.2

Pre-Cast

a) Excavation and Bedding

Excavation shall be made to the required depth as shown on the Drawings. All soft and unsuitable material shall be removed and replaced with a suitable material acceptable to the Engineer.

Bedding shall consist of Class B Concrete conforming to the requirements of Item 401 and shall be to the section and dimension shown on the Drawings.

b) Placing

The precast concrete kerbs shall be set in 1:3 of cement sand mortar to the line, level and grade as shown on the Drawings or as directed by the Engineer.

c) Joints

Joints between consecutive kerbs shall be three (3) to five (5) mm wide and filled with cement mortar to the full section of the kerb.

d) Backfilling

Backfilling shall meet the requirements of Item 601.3.1 (h).

601.3.3

Extruded Concrete Kerbing and Channels

a) Excavation and Bedding

Excavation and bedding shall conform to the requirements as described under item 601.3.1 (a).

b) Placing

Concrete shall be fed to the machine at a uniform rate. The concrete shall be of such consistency that after extrusion it will maintain the shape of the kerb section without support and shall contain the maximum amount of water that will permit this result. The machine shall be operated under sufficient uniform restraint to forward motion to produce a well compacted mass of concrete which requires no further finishing other than light brushing with a brush filled with water only. The forming tube portion of the extrusion machine shall be readily adjustable vertically during the forward motion of the machine. A grade line gauge or pointer shall be attached to the machine so that a continual comparison can be made between the kerb being placed and the established kerb grade as indicated by an offset guideline.

The top end face of the finished kerb shall be true and straight and the top surface of the kerb shall be of uniform width, free from bumps or surface pits larger than fifteen (15) mm in diameter. When a straight-edge three (3) meters long is laid on the top or face of the kerb or surface of the gutter, the surface shall not be more than five (5) mm from the edge of the straightedge except at grade changes or curves.

Where adhesive is used to bond the kerb to an existing pavement, the surface shall be first thoroughly cleaned of all dust, loose material and oil, the cost of which shall be included in other items of work.

c) Joints

Expansion joints shall be constructed by sawing through the kerb section to its full depth. The width of the cut shall be such as to admit the joint filter with a tight fit. Preformed joint filler shall conform to the provisions of Item 601.2 and shall be inserted and mortared in place.

If sawing is performed before the concrete has hardened, the adjacent portion of the kerb shall be supported firmly with close fitting shields and the operations of sawing and inserting the joint filler shall be completed before curing the concrete.

Alternatively pre-cut joint fillers shall be permitted to be placed at the location of the expansion joints prior to the placing of the extruded kerb with the approval of the Engineer. The joint fillers shall be set firmly in place in a vertical position to the line and grade of the kerb profile.

d) Curing and Backfilling

Curing and backfilling shall be as described in item 601.3.1(g) and Item 601.3.1 (h).

601.4 MEASUREMENT AND PAYMENT

601.4.1 Measurement

The unit of measurement for concrete kerb, gutter, or combination of kerb and gutter, channel, or extruded kerbs and channels shall be measured by the linear

meter along the front face of the section at the finished grade elevation. Deduction in length will be made for drainage structure installed in the kerbings such as catch basins and drop inlets etc. Measurement will not include any area in excess of those shown on the Drawings except for any area authorised by the Engineer in writing.

601.4.2 Payment

Measured and accepted quantities shall be paid for at the contract unit price per linear meter for each of the particular pay item listed below and shown in the Bill of Quantities which prices and payment shall constitute full compensation for furnishing and placing all materials for concrete, for reinforcing steel if required on the Drawings for expansion Joints, material, form for drainage opening, excavation, backfilling and dumping and disposal of surplus material and for all labour, equipment, tool and incidentals necessary to complete the item.

Payment for expansion joint filler material used in transverse expansion and contraction joints in kerbs and channel shall be understood to be included in the price tendered per linear meter for the kerbs and channels and shall not be paid for separately.

Concrete and mortar required for bedding of precast concrete kerbs as shown on the Drawings shall not be paid for as separated item, but the cost shall be included in the contract unit price for precast concrete kerb.

Pay Item No.	Description	Unit of Measurement
601a	Concrete Kerb, in place, Type _____	M
601b	Combination of Kerb and Gutter in Place, Type _____	M
601c	Combination of Kerb and Channel in Place, Type _____	M
601d	Pre-Cast Kerb in Place, Type _____	M
601e	Concrete Channel, Type _____	M
601f	Extuded Kerb and Channel, Type _____	M

ITEM 602 ASPHALT CONCRETE AND CEMENT CONCRETE SIDEWALK

602.1 DESCRIPTION

This work shall consist of the construction of sidewalks which can be asphalt concrete, plain portland cement concrete, or precast Portland cement concrete slabs (450x450) mm or smaller or interlocking concrete blocks all in accordance with these specifications and to the line, grade, levels and dimensions shown on the Drawings or as required by the Engineer.

602.2 MATERIAL REQUIREMENTS**602.2.1 Cement Concrete**

The Concrete shall be either Class A or Class C as indicated on the drawings and in accordance with Item 401. 1. 1.

602.2.2 Asphalt Concrete

Asphaltic concrete shall conform to the requirements of Item 305 - Asphalt Concrete Pavement - for Class B mixture.

602.2.3 Expansion Joint Filler

Unless otherwise directed the joint filler shall have a thickness of five (5) mm and conform to the requirements of Item 601.2.

602.2.4 Forms

Forms shall be of wood or metal as approved by the Engineer and shall extend to the full depth of the concrete. All forms shall be straight, free from warp and of adequate strength to resist bending.

602.2.5 Bed Course Material

Bed course material shall consist of cinders, sand, slag, gravel, crushed stone or other approved materials of such gradation that all particles will pass through a 112" (12.5 m) sieve.

602.2.6**Asphaltic Prime Coat**

Asphaltic prime coat material shall conform to the requirements of Item 301 for Cut-back Asphalt.

602.3**CONSTRUCTION REQUIREMENTS****602.3.1****Asphalt Concrete Sidewalk****(a) Excavation**

Excavation shall be made to the required depth and to a width that will permit the installation and bracing of the forms. The foundation shall be shaped. and compacted to minimum ninety (90) percent of the maximum dry density as determined by AASHTO T-191 Method. The surface shall be even conforming to the section shown on the drawings. All soft material shall be removed and replaced with acceptable material.

(b) Placing of Bed Course Material

The bed course material shall be compacted in layers not exceeding ten (10) cm, to the depth shown on the drawings and to the line and grade of the finished sidewalk surface.

(c) Priming the Bed Course Material

The prepared bed course material shall receive an application of prime coat in accordance with the requirements of Item 302 and approved by the Engineer.

(d) Placing the Asphalt Concrete

The asphalt concrete shall be placed on the previously primed prepared bed only when, in the opinion of the Engineer the bed is sufficiently dry and weather conditions are suitable. The mixture shall be placed on one or more courses of uniform thickness as shown on the Drawings. Each course shall be smoothed by raking or screeding and shall be thoroughly compacted by rolling with a hand operated roller or a type satisfactory to the Engineer. After compaction, the surfacing shall be of the thickness and section shown on the Drawings, shall be smooth, even and of a dense and uniform texture. Forms, if used, shall be removed and the shoulders shaped and compacted to the required section.

602.3.2**Cement Concrete Sidewalk****(a) Excavation**

Excavation shall meet the requirements of Item 602.3.1 (a).

(b) Placing of Bed Course Material

Where indicated on the drawings the bed course material shall be placed in accordance with Item 602.3.1 (b).

(c) Forms and Expansion Joints

All forms shall be staked securely in position at the correct line and elevation.

Expansion joint filler shall be set in the position shown on the Drawings before the placing of the concrete is started. The joint filler shall be placed 5 mm below the top surface of the finished sidewalk.

(d) Placing the Cement Concrete Material

The mixing, placing, finishing, and curing of concrete shall be as provided under Item 401 -Concrete.

Before the concrete has set- the surface of the concrete shall be trawled until it is of uniform smoothness and is true to the lines, elevations, and surface required.

The surface shall be cut through to a depth of one (1) cm with a trowel at intervals of one (1) meter or where required, in straight lines perpendicular to the edge of the sidewalk. The surface shall then be brushed. The edges of the sidewalk and the transverse cuts shall be shaped with a suitable tool so formed as to round the edges to a one and half (1.5) centimeters radius.

(e) Precast Elements

Precast concrete slabs or interlocking concrete blocks shall be set on the bed course material where indicated on the drawings or as directed by the engineer to provide a smooth top surface without ridges or lumps at joints.

Precast concrete units shall be fair faced cast to the sizes and dimensions as indicated on the drawings.

The concrete used for pre-cast unit shall conform to the specifications laid down in item 401-Concrete. The Contractor shall be required to submit a sample of pre-cast unit for the approval of the Engineer. All pre-cast units shall strictly conform to the approved sample.

A pre-cast unit cracked or damaged before, during or after erection shall be removed from the works and replaced by the Contractor at his own expense. All pre-cast units shall be smoothly finished to the required lines, grades angles etc. Holes, grooves, pockets, hooks shall be provided as shown or as directed by the Engineer.

The units shall be properly stacked on a platform without causing any cracks or damage. Curing of all the pre-cast units shall be done in accordance with item 401.

602.4 MEASUREMENT AND PAYMENT

602.4.1 Measurement

The quantity to be paid for shall be the number of square meters of asphalt concrete or cement concrete sidewalk complete in place and accepted, measured in the place of the sidewalk surface.

602.4.2 Payment

The quantity as determined above, shall be paid for at the contract unit price per square meter for the pay items listed below and shown in the Bill of Quantities, which price and payment shall constitute full compensation for furnishing and placing all materials, for asphaltic concrete, Portland cement concrete, expansion joint material, for excavating and compacting the foundation bed, for furnishing and placing for forms, and for all labour, equipment, tools and incidentals necessary to complete the item.

Pay Item No.	Description	Unit of Measurement
602a	Asphalt Concrete Sidewalk	SM
602b	Cement Concrete Sidewalk	SM
602c	Precast Concrete Slab Sidewalk	SM
602d	Precast Concrete Interlocking Block Sidewalks	SM

ITEM 203 ASPHALTIC BASE COURSE PLANT MIX

203.1 DESCRIPTION

This work shall consist of furnishing of plant, labour, equipment and material and performing all operations in connection with the construction of an asphaltic plant-mix base course on a previously constructed and accepted subgrade, subbase or base course, subject to terms and conditions of the Contract, and in strict accordance with this Section of the Specification, the Drawings and the directions of the Engineer.

203.2 MATERIAL REQUIREMENTS**203.2.1 Mineral Aggregate**

Mineral aggregate for bituminous base course shall consist of coarse aggregate, fine aggregate and filler material, if required, all conforming with the following requirements:

Coarse aggregate which is the material retained on AASHTO No. 4 sieve shall consist of crushed rock, crushed gravel or crushed boulder. It shall be clean, hard, tough, sound, durable, free from decomposed stones, organic matter, shale, clay lump or other deleterious substances. Rock or boulders from which coarse aggregate is obtained, shall be of uniform quality throughout the quarry.

The crushing shall be so regulated that at least ninety five (95) percent by weight of material retained on AASHTO No. 4 sieve shall consist of pieces with at least two (2) mechanically fractured faces, and when tested for stability of bituminous mix shall show satisfactory stability.

Fine aggregate which is material passing No. 4 sieve, shall consist of 100% crushed material from rock or boulder. No natural sand will be allowed in the mix.

When the combined grading of the coarse and fine aggregates is deficient in material passing No. 200 sieve, additional filler material shall be added. The filler material shall consist of finely divided rock dust, hydrated lime, hydraulic cement or other suitable mineral matter. However, in case the coarse aggregates are of quartizitic nature, then hydrated lime or a better material shall be allowed. At the time of use, it shall be sufficiently dry to flow freely. Filler material shall conform to following gradation:

US Standard Sieve	Percent Passing by Weight
No.30	100
No.50	95-100
No.200	70-100

The coarse and fine aggregates shall meet the following applicable requirements:

- a) The percentage of wear by the Los Angeles Abrasion test (AASHTO T 96) shall not be more than forty (40).
- b) The loss when subject to five cycles of the Sodium Sulphate Soundness test (AASHTO T 104) shall be less than twelve (12) percent.
- c) The Sand Equivalent (AASHTO T 176) determined after all processing except for addition of asphalt cement shall not be less than forty five (45).
- d) Fine aggregates shall have a liquid limit not more than 1 twenty five (25) and a Plasticity Index of not more than six (6) as determined by AASHTO T 89 and T-90.
- e) The portion of aggregate retained on the 9.5 mm (318 inch) sieve shall not contain more than 15 percent by weight of flat and / or elongated particles (ratio of maximum to minimum dimensions = 2.5:1).
- f) Stripping test shall be performed on coarse aggregates as described under AASHTO T-182 and only that material shall be allowed which qualifies the test.
- g) The coarse aggregates shall be checked if desired by the Engineer for cationic and anionic behaviour so that their affinity with the bitumen to be used is verified.
- h) Petrographic examination of the coarse aggregate shall be conducted if so directed by the Engineer.

203.2.2 Asphaltic Material

Asphalt binder to be mixed with the aggregate to produce asphaltic base shall be asphalt cement having penetration grade 40-50, 60-70 or 80-100 as specified by the Engineer. Generally it will meet the requirements of AASHTO M-20.

203.2.3 Asphalt Concrete Base Course Mixture

The composition of the asphaltic concrete paving mixtures for base course shall conform to Class A and / or Class B shown in the following table:

TABLE 203-1**Combined Aggregate Grading Requirements**

Mix Designation	Class A	Class B
Use	Levelling/Base	Levelling/Base
Compacted Thickness	70 - 90 mm	50 - 80 mm
U.S. Standard Sieve Size Percent passing by weight		
2" (50 mm)	100	-
1 1/2" (38 mm)	90-100	100
1" (25 mm)	-	75-90
3/4" (19 mm)	56-75	65-80
1/2" (12.5 mm)	-	55-70
3/8" (9.5 mm)	-	45-60
No. 4 (4.75 mm)	23-40	30-45
No. 8 (2.38 mm)	15-30	15-35

No. 50 (0.300 mm) 4-10 5-15

No. 200 (0.075 mm) 3-6 2-7

Asphalt Content weight 3 3

Percent of total mix (Minimum) (Minimum)

The asphalt concrete levelling / base course mixture shall meet the following Marshall Test Criteria.

Compaction, number of blows each end

of specimen 75

Stability 1000 Kg (Min.)

Flow, 0.25 mm (0.01 in.) 8-14

Percent air voids in mix 4-8

Percent voids in mineral

aggregates According to Table 5.3 MS-2,

Asphalt institute, sixth edition

1993.

Loss in Stability 25 percent (Max.)

Mixes composed of larger size aggregates with maximum size upto 38 mm (1.5 inches) will be prepared according to modified Marshall method as per MS-2 Asphalt institute, sixth edition, 1993 or the latest edition. The procedure is basically the same as the original method except for following differences that are due to the larger specimen size that is used:

a) The hammer weighs 10.2 kg (22.5 lb.) and has a 149.4 mm (5.88 inches) flat tamping face. Only mechanically-operated device is used for the same 457 mm (18 inches) drop height.

- b) The specimen has a 152.4 mm (6 inches) diameter by 95.2 mm (3.75 inches) height.
- c) The batch weights are typically of 4 Kg.
- d) The equipment for compacting and testing (molds and breaking heads) are proportionately larger to accommodate the larger specimens.
- e) The mix is placed in the mold in two approximately equal increments, with spading performed after each increment to avoid honey-combing.
- f) The number of blows needed for the larger specimen is 1.5 times (75 or 112 blows) of that required for the smaller specimen (50 or 75 blows) to obtain equivalent compaction.
- g) The design criteria shall be modified as well, the minimum stability shall be 2.25 times and the range of flow values shall be 1.5 times normal-sized specimens.
- h) Similar to the normal procedure, following values shall be used to convert the measured stability values to an equivalent value for a specimen with a 95.2 mm (3.75 inches) thickness, if the actual thickness varies:

Approximate Height Specimen Volume Correlation

mm (inches) (Cubic cm) Ratio

88.9 (3 1/2)	1608 to 1626	1.12
90.5 (3 9/16)	1637 to 1665	1.09
92.1 (3 5/8)	1666 to 1694	1.06
93.7 (3 11/16)	1695 to 1723	1.03
95.2 (3 3/4)	1724 to 1752	1.00
96.8 (3 13/16)	1753 to 1781	0.97
98.4 (3 7/8)	1782 to 1810	0.95
100.0 (3 15/16)	1811 to 1839	0.92
101.6 (4)	1840 to 1968.	0.90

203.2.4 Job-Mix Formula

At least one (1) week prior to production, a Job-Mix Formula (JMF) for the asphaltic base course to be used for the project, shall be established jointly by the Engineer and the Contractor in the project laboratory. Job mix formula shall combine the mineral aggregates and asphalts in such proportion conforming to specification requirements.

The JMF shall be established by MARSHALL Method of Mix Design according to the procedure prescribed in the Asphalt Institute Manual Series No.2 (MS-2), sixth edition 1993, or the latest Edition.

The JMF, with the allowable tolerances shall be within the range specified in Item 203.2.3. Each JMF shall indicate a single percentage of aggregate passing each required sieve size and a single percentage of bitumen to be added to the aggregate.

The ratio of wt. of filler (passing sieve No. 200) to that of asphalt shall range between 1-1.5 for hot climate areas with temperature more than 40°C.

After the JMF is established, all mixtures furnished for the project represented by samples taken from the asphalt plant during operation, shall conform thereto Moreover upon receiving the job-mix, approved by the Engineer, the Contractor shall adjust his plant to proportion the individual aggregates, mineral filler and asphalt to produce a final mix that, when compared to job mix formula shall be within the following limits.

Maximum Variation of Percentage of Materials

Retained No.4 and larger \pm 7.0%

Passing No.4 to No. 100 sieve \pm 4.0%

Passing No.200 \pm 1.0%

Asphalt Content

Weight percent of total mix \pm 0.3%

In addition to meeting the requirements specified in the proceeding items, the mixture as established by the JMF shall also satisfy the following physical property

Loss of Marshall. stability by immersion of specimen in water at sixty (60) degree centigrade for 24 hours as compared with stability measured after immersion in water at 60 degrees centigrade

for 20 minutes shall not exceeds twenty five (25) percent. If the mixture fails to meet this criterion, JMF shall be modified or an antistripping agent shall be used.

Should a change of sources of materials be made, a new Job Mix Formula shall be established before the new material is used. When unsatisfactory results or other conditions make it necessary, a new Job Mix Formula will be required

203.3 CONSTRUCTION REQUIREMENTS

203.3.1 Bituminous Mixing Plant

Plants used for the preparation of bituminous mixtures shall be "Batching Plants" conforming to AASHTO M 156, and of adequate capacity, coordinated and operated to produce a mixture within the limits of these specifications. Plant shall have minimum three cold bins and at least 3.5 decks of hot sieves.

203.3.2 Preparation of Aggregates

Before being fed to the dryer, aggregates for the asphaltic base courses shall be separated into three or more sizes and stored separately in cold bins. One bin shall contain aggregate of such size that eighty (80) percent will pass sieve No. 4, and the other two bins shall contain aggregate of such sizes that eighty (80) percent will be retained on sieve No. 4. Should fine material, be incorporated in the mix, separate bin shall be provided in addition to the three bins mentioned above. If filler is used as a separate component it will also be stored and measured separately and accurately before being fed into the mixer through filler screw mechanism.

Asphalt cement shall be heated within a temperature range of hundred and thirty five to hundred and sixty three (135-163) degrees centigrade at the time of mixing. Asphalt cement heated above maximum shown shall be considered overheated and shall be rejected and removed from job site.

Dried aggregate weighed and drawn to pugmill shall be combined with proportionate quantity of asphalt cement according to the job mix formula. Temperature of asphalt, except for temporary fluctuations, shall not be lower than fifteen (15) degrees centigrade below the temperature of the aggregate, at the time, the two materials enter into the pugmill.

For placing the materials in bins or in moving them from bins to the dryer, any method which causes segregation or uncontrolled combination of materials of different grading, shall be discontinued and the segregated or degraded materials shall be prescreened for reuse.

Each aggregate ingredient shall be heated and dried at temperature not to exceed hundred and sixty three (163) degrees centigrade. If aggregate contain sufficient moisture to cause foaming in the mixture or their temperature is in excess of hundred and sixty three (163) degrees centigrade, they shall be removed from the bins and returned to their respective stock piles. In no case, shall the temperature of asphaltic mix exceed 163 degree centigrade when discharged from the pugmill.

Immediately after heating, the aggregates shall be screened to required sizes and stored in separate hot bins for batching and mixing with bituminous material.

Asphalt plant shall have minimum three and half ($3 \frac{1}{2}$) sieve decks to effectively control the gradation of hot bins.

203.3.3 Hauling Equipment

Dump truck used for hauling bituminous mixtures shall have tight, clean, smooth metal beds which have been thinly coated with an approved material to prevent adhering of material to the beds. Each truck shall have a cover of canvas or of other suitable material of sufficient size as to protect the mixture from the weather. The mixture will be delivered on the road at a temperature not less than hundred and thirty (130) degree C. Drivers of dump trucks will ensure that while reversing the vehicles, paver is not pushed back producing a hump.

203.3.4 Bituminous Pavers

Bituminous pavers shall be self-contained, power-propelled units, provided with an automatically controlled activated screed or strike-off assembly, heated if necessary, capable of spreading and finishing courses of bituminous plant mix material in lane widths applicable to the specified typical section and thickness shown on the plans. Pavers used for shoulders and similar construction shall be capable of spreading and finishing course of bituminous plant mix material in widths shown on the plans.

The paver shall be equipped with a receiving hopper having sufficient capacity for a uniform spreading operation. The paver shall be equipped with automatic feed controls, properly adjusted to maintain a uniform depth of material ahead of the screed.

The screed or strike-off assembly shall be capable of producing a finished surface of the required evenness and texture without tearing, shoving or gouging the mixture.

When laying the mixtures, the paver shall be capable of being operated at forward speeds consistent with satisfactory laying of the mixture. The paver shall be operated at speeds which will give the best result for the type of power being used.

The mixed material shall be delivered to paver in time to permit completion of spreading, finishing and compaction of mixture during day light hours.

The paver shall be equipped with automatic screed controls with sensors for either or both sides of the paver, capable of sensing grade from an outside reference line, sensing the transverse slope of the screed and providing the automatic signals which operates the screed to maintain the desired grade and transverse slope. The sensor shall be so constructed that it will operate from a reference line or a ski-like arrangement.

The transverse slope controller shall be capable of maintaining the screed at the desired slope within plus or minus 0.1 percent variation.

Manual operation will only be permitted in the construction of irregularly shaped and minor areas.

Whenever a breakdown or malfunction of the automatic controls occurs, the equipment may be operated manually or by other methods in order to allow the contractor to use the asphalt already produced at the plant or in transit, provided this method of operation will produce results otherwise meeting the specifications.

Reference lines will be required for both outer edges of the travelled way for each main line roadway for vertical control. Horizontal control utilizing the reference line will be permitted. The grade and slope for intermediate lanes shall be controlled automatically from reference lines or by means of a ski and a slope control device or a dual ski arrangement. When the finish of the grade prepared for paving is superior to the established tolerance and, when in the opinion of the Engineer, further improvement to the line, grade, cross sections and smoothness can best be achieved without the use of the reference line, a ski-like arrangement may be substituted subject to the approval of the Engineer. The use of the reference lines shall be reinstated immediately whenever the Contractor fails to maintain a superior pavement. The Contractor shall furnish and install all pins, brackets, tensioning devices, wire and accessories necessary for satisfactory operation of the automatic control equipment.

203.3.5 Rollers

Rollers shall be steel wheel, pneumatic tyre and vibratory, or a combination thereof. The roller(s) shall be in good condition, capable of reversing without backlash, and shall be operated at speeds slow enough to avoid displacement of the bituminous mixture. The number and weight of rollers shall be sufficient to compact the mixture to the required density while it is still in a workable

condition. Vibratory rollers shall be acceptable for bituminous mixture compaction. The use of equipment, which results in excessive crushing of the aggregate will not be permitted.

203.3.6 Preparation of Base or Existing Pavement Surface

Before spreading materials, the surface of base or existing pavement on which the mix is to be placed shall be conditioned by application of a prime or tack coat as specified.

After a prime coat is applied, it shall be left undisturbed no less than twenty four (24) hours. The Contractor shall maintain the primed surface until the mix material has been placed. This maintenance shall include the spreading of sand or other approved material, if necessary to prevent adherence of the prime coat to the tyres of vehicles using the primed surface, and patching any breaks in the primed surface with additional bituminous material. Any area of primed surface that has become damaged shall be repaired before the mix is placed, to the satisfaction of Engineer. It shall be ensured that primed surface is not in tacky condition, when premix is laid.

After a tack coat is applied, it shall be allowed to dry until it is in the proper condition of tackiness to receive the mix. The tack coat shall be applied only as far in advance of the placing of mix, as is necessary to obtain the proper condition of tackiness. Any breaks in the tack coat shall be repaired.

When the surface of the existing pavement or old base is irregular, it shall be brought to uniform grade and cross-section by levelling course as directed. The levelling course mixture shall conform to the requirements of Item 203.2.

A thin coating of bituminous material shall be sprayed on contact surface of curbing, gutters, manholes, and other structures, prior to the bituminous mixture being placed against them.

203.3.7 Spreading and Finishing

The mixture shall be laid upon an approved surface, spread and struck off to the section and elevation established. Bituminous pavers shall be used to distribute the mixture either over the entire width or over such partial width as may be practicable.

The longitudinal joint in one layer shall offset to that in the layer immediately below, by approximately 15.0 cm; however, the joint in the top layer shall be at the centreline of the pavement if the roadway comprises two lanes of width, or at lane lines if the roadway is more than 2 lanes in width.

On areas where irregularities or unavoidable obstacles make the use of mechanical spreading and finishing equipment impracticable, the mixture shall be spread, raked and luted by hand-tools.

For such areas the mixture shall be dumped, spread and screeded to give the required compacted thickness, ensuring even distribution of coarse and fine material.

When production of the mixture can be maintained and wherever practical, pavers shall be used in echelon to place the wearing course in adjacent lanes and compacted to form a surface without lateral joint.

All mixtures shall be spread at a temperature of not less than hundred and thirty (130) degree C and all initial rolling or tamping shall be performed when the temperature of the mixture is such that the sum of the air temperature plus the temperature of the mixture is between 165 degree C and 190 degree C. The mixture shall not be placed on any wet surface or when weather conditions will otherwise prevent its proper handling or finishing.

203.3.8 Compaction

After spreading and strike off and as soon as the mix condition permits the rolling to be performed without excessive shoving or tearing, the mixture shall be thoroughly and uniformly compacted. Rolling shall not be prolonged when cracks appear on the surface.

Initial or breakdown rolling shall be done by means of either a tandem steel roller or three wheeled steel roller. Rolling shall begin as soon as the mixture will bear the roller without undue displacement.

The number and weight of rollers shall be sufficient to obtain the required compaction while the mixture is still in workable condition. The sequence of rolling and the selection of roller types shall provide the specified pavement density. Initial rolling with a tandem steel roller or a three-wheeled steel roller shall follow the paver as closely as possible.

Unless otherwise directed, rolling shall begin at the lower side and proceed longitudinally, parallel to the road centerline, each trip overlapping one-half of the roller width, gradually progressing to the crown of the road. When paving in echelon or abutting a previously placed lane, the longitudinal joint should be rolled first followed by the regular rolling procedure. On super elevated curves the rolling shall begin at the low side and progress to the high side by overlapping of longitudinal trips parallel to the centerline. Intermediate rolling with a pneumatic tyred roller shall be done behind the initial rolling. Final rolling shall eliminate marks from previous rolling. In no case shall the temperature be less than hundred and twenty (120) degree C. for initial breakdown rolling while all other compaction operations shall be completed before the temperature drops down to hundred and ten (110) degree C.

Rollers shall move at a slow but uniform speed with the drive roll or wheels nearest the paver. Rolling shall be continued until all roller marks are eliminated and a minimum density of Ninety

seven (97) percent of a laboratory compacted specimen made from asphaltic material obtained for daily Marshall density is achieved.

Any displacement resulting while reversing the direction of a roller, or from other causes, shall be corrected at once by the use of rakes and addition of fresh mixture. when required. Care shall be exercised in rolling not to displace the line and grade of the edges of the bituminous mixture.

To prevent adhesion of the mixture to the rollers, wheels of rollers shall be kept properly moistened with water or water mixed with very small quantities of detergent or other approved material. Excess liquid will not be permitted.

Along forms, curbs, headers, walls and other places not accessible to the roller, the mixture shall be thoroughly compacted with hot hand tampers, smoothing irons or with mechanical tampers. On depressed areas, tempers be used or cleated compression strips may be used under the roller to transmit compression to the depressed area.

Any mixture that becomes loose and broken, mixed with dirt, or is in any way defective in finish or density shall be removed and replaced with fresh hot mixture, which shall be compacted to conform with the surrounding area. Any area showing an excess or deficiency of bituminous material shall be removed and replaced.

Sequence of laying and compaction of premix shall be so managed, that a long time does not elapse between successive dump trucks, which may cool down the uncompacted premix, between paver and compacted asphalt below 120° C.

203.3.9 Frequency of Testing for Cores

One core shall be taken for each 100 linear meter of each lane of Asphaltic Base, or fraction thereof, in special cases. If the core so taken is failed against the specified 97% density, then two (2) additional cores shall be taken in the longitudinal alignment of the road at an interval of three (3) meters on either side with respect to the failing core and shall be tested against field density. If all the three cores give an average of 97% compaction, and the individual compaction of the core is not less than ninety five (95) percent, then the compaction is acceptable. If average of the cores further fails against compaction, then retake the cores at a distance of fifteen (15) meters on either side and compaction shall be checked for all the five cores in the same fashion. If average of five cores is 97%, the area will be accepted. In case average is ninety six 96% or more, then Engineer may withhold the payment in full or partly and observe behaviour during maintenance period, for the release of payment or otherwise. In case of failure of the average of these five cores giving average compaction of less than 96%, the failed area shall be removed and subsequently be replaced by specified mix in an approved manner at the expense of contractor.

203.3.10 Surface Tolerances

After completion of final rolling, the finished surface shall be tested for smoothness with three (3) meters straightedge by Engineer at selected locations. The variation of surface from testing edge of straight edge between any two (2) contacts with the surface shall at no point exceed six (6) millimeters when placed either parallel or perpendicular to centreline of roadway.

Any irregularities that exceed the specified tolerances or that retain water on the surface shall be corrected by removing the defective area and replacing with new asphaltic base course without additional cost to the Employer.

203.3.11 Base Thickness Tolerances

For determination of thickness, one (1) core for each hundred (100) linear meter of each lane shall be taken. Unless, otherwise permitted, cores extracted for thickness measurement shall not be used for density determination and density cores shall not be used for thickness measurements.

When layer thickness of asphaltic base course is deficient by more than five (5) mm from that specified in the Drawings, the deficiency shall be removed with satisfactory base course material and / or made up by additional asphalt concrete wearing course thickness without extra cost to the Employer. If such remedial action is authorised, revised thickness determinations shall be made by measurements of new cores taken after placing of "Asphaltic Wearing Course" material or as directed by the Engineer. If base course deficiencies are corrected in this manner, full payment for the "Asphaltic Base Course" will be made to the Contractor, but no additional payment will be made for the increase in thickness of the "Asphaltic Wearing Course".

203.3.12 Acceptance Sampling and Testing

Acceptance of samples and testing of materials and construction requirements, shall be governed by the relevant, 'Table for Sampling and Testing Frequency" or as approved by the Engineer.

203.3.13 Weather Limitations

Hot asphaltic mixtures shall be placed only when the air temperature is four (4) degrees centigrade or above and no asphalt shall be laid under foggy or rainy weather or over moist surface.

203.3.14 Trial Section

Contractor shall prepare a trial section before the start of work in light of procedure given in clause 1.20 (General).

203.4 MEASUREMENT AND PAYMENT

203.4.1 Measurement

The quantities for asphaltic levelling 1 base course will be measured by volume in cubic meters compacted in place. Measurement shall be based on the dimension as shown on plan or as otherwise directed or authorized by the Engineer. No measurement shall be made for unauthorized areas or for extra thickness.

The quantity of asphaltic material used is included in the asphalt concrete mixture and will not be measured separately.

Quantities of liquid asphalt, wasted or remaining on hand after completion of the work, shall not be measured or paid for.

203.4.2 Payment

The quantities determined as provided above shall be paid for at the contract unit price respectively for each of the particular pay items listed below and shown in the Bill of Quantities, which prices and payment shall constitute full compensation for all the costs necessary for the proper completion of the work prescribed in this item. Asphalt additive or antistripping agent, if allowed and used to meet with. JMF requirement shall not be paid directly, payment shall be deemed to be included in the respective pay items of Asphaltic Base Course.

Pay Item	Description	Unit of Measurement
No.		
203a	Asphaltic Base Course	
	Plant Mix (Class A)	CM
203b	Asphaltic Base Course	
	Plant Mix (Class B)	CM
203c	Asphaltic Levelling Course	
	Plant Mix (Class A)	CM
203d	Asphaltic Levelling Course	
	Plant Mix (Class B)	CM

ITEM 216 SOILING STONE

216.1 DESCRIPTION

This item shall consist of laying of soling stone, handpacked on a surface (subgrade) prepared earlier and all interstices filled with sand or similar approved materials to provide proper bonding of all the stones with each other.

216.2 MATERIAL REQUIREMENTS

The material for soling shall be round and durable rock, properly shaped or boulders of maximum size 15-20 cm. The filler material to fill the interstices shall be coarse sand or rock dust or any other material approved by the Engineer. Material shall be cohesionless and clean to allow its free flow down to the bottom of soling area.

216.3 CONSTRUCTION REQUIREMENT

216.3.1 The subgrade to receive the soling stone shall be prepared under relative item of the work.

216.3.2 Placing of Soling Stone

The soling stone shall be placed from outer edges of the road and finishing at the crown of the road in such J way that all stones are properly handpacked and keyed with the surrounding stones. It shall be ensured that the maximum dimension is kept in vertical position ensuring the variation of the size of the stone does not exceed $\pm 1'$ of specified thickness of soling stone:

The filler material shall be dry and in free flow condition when placed over the soling stone. The filler material shall be kept adding while the soling stones are rolled under a 6 tons roller. The addition of filler material shall continue till the area does not absorb more material and it is ensured that all interstices are fully filled. The area will then be watered and kept under rolling to achieve a smooth surface.

216.4 MEASUREMENT AND PAYMENT**216.4.1 Measurement**

The area to be measured shall be bound by the lines shown on the drawings whereas the normal thickness shall be that which is described in BOO. The measurement shall be made in CM.

216.4.2 Payment

The quantities determined as provided above shall be paid for at the contract unit price for cubic meter which price and payment shall be full compensation for all cost of materials, manpower and equipments; involved in the proper completion of work.

Pay Item	Description	Unit of
No.		Measurement

216 Laying of Soling Stone CM

ITEM 305 ASPHALT CONCRETE WEARING COURSE – PLANT MIX

305.1 DESCRIPTION

This work shall consist of furnishing aggregates and asphalt binder at a central mixing plant, to a specified mixing temperature, transporting, spreading and compacting the mixture in an approved manner on primed or tacked base, subbase, subgrade, bridge deck or concrete pavement in accordance with these specifications and in conformity with the lines, grades and typical cross-sections shown in the drawings or as directed by the Engineer.

305.2 MATERIAL REQUIREMENTS

305.2.1 Mineral Aggregates

The Aggregates shall consist of coarse aggregates, fine aggregates and filler material, if required and shall be clean, hard, tough, durable and sound particles of uniform quality, geology, petrology and free from decomposed material, vegetable matter, soil, clay, lumps and other deleterious substances.

Coarse aggregate which is the material retained on an AASHTO No. 4 Sieve, shall consist of one hundred (100) % crushed rock or crushed gravel having two (2) faces mechanically crushed. The type of source shall be uniform throughout the quarry location from where such a material is obtained. The coarse aggregates shall be free from an excess of flat or/and elongated particles.

Fine aggregate which is the material passing from AASHTO No. 4 sieve, shall consist of 100% crushed material from rock or boulder. Fine aggregate shall be stored separately, and no natural sand will be allowed in the mix.

When the combined grading of the coarse and fine aggregates is deficient in material passing the AASHTO No. 200 sieve, mineral filler material shall be added as approved by the Engineer. The filler shall consist of finely divided mineral matter such as rock dust, hydrated lime, hydraulic, calcined dust cement or other suitable mineral matter free from lumps, balls or other deleterious material and shall conform to the following gradation:

Sieve Designation		Percent Passing by Weight
mm	Inch	
0.600	No.30	100
0.300	No.50	95-100
0.075	No.200	70-100

The coarse and fine aggregates shall meet the following requirements:

- a) The percent of wear by the Los Angeles Abrasion test (AASHTO T 96) shall not be more than thirty (30).
- b) The loss when subjected to five cycles of the Sodium Sulphate Soundness test (AASHTO T 104) shall be less than twelve (12) percent.
- c) The Sand Equivalent (AASHTO T 176) determined after all processing except for addition of asphalt cement shall not be less than 45.
- d) All aggregates shall have a liquid limit of not more than twenty five (25) and a Plasticity Index of not more than four (4) as determined by AASHTO T-89 and T-90.
- e) The portion of aggregates retained on the 9.5 mm (3/8 inch) sieve shall not contain more than 10 percent by weight of flat and/or elongated particles (ratio of maximum to minimum dimension = 2.5:1).
- f) Stripping test shall be performed on crush aggregates as described under AASHTO-182 and only that material shall be allowed which qualifies the test.
- g) The coarse aggregates shall be checked if desired by the Engineer for cationic and anionic behaviour so that their affinity with the bitumen to be used is verified.
- h) Petrographic examination of the coarse aggregate shall be conducted if so directed by the Engineer.

The percentage of particles having certain proportions between their largest and smallest dimensions (i.e. between the largest distance the particles can fill out between two parallel planes that will permit the particle to pass), shall be determined in the following way:

- i. Form a sample of coarse aggregates, all particles passing No. 4 sieve are eliminated. The sample shall be of sufficient quantity that at least 100 particles remain.
- ii. By means of a sliding calliper, the largest and smallest dimensions, as defined above, are determined for each particle and its proportion calculated (with one decimal).
- iii. The total weights of particles having the proportions two and a half (2.5) or less and three (3) or less, are determined and their percentage in relation to the total sample are calculated.

305.2.2 Asphaltic Material

Asphaltic binder to be mixed with the aggregate to produce asphaltic base shall be asphalt cement penetration grade 40-50, 60-70 or 80-100 as specified by the Engineer. Generally it will meet the requirement of AASHTO M-20.

305.2.3 Asphalt Concrete Wearing Course Mixture

The composition of the asphaltic concrete paving mixture for wearing course shall conform to Class A and/or Class B shown in the following table:

Table 305-1**Asphalt Concrete Wearing Course Requirements**

Mix Designation	Class A	Class B
Compacted Thickness	50-80 mm	35-60 mm

Combined Aggregate Grading Requirements

Sieve Designation		Percent Passing by Weight	
Mm	Inch		
25	1	100	-
19	3/4	90-100	100
12.5	1/2	-	75-90
9.5	3/8	56-70	60-80
4.75	No.4	35-50	40-60
2.38	No.8	23-35	20-40
1.18	No.16	5-12	5-15
0.075	No.200	2-8	3-8

Asphalt Content weight

percent of total mix 3.5 (Min.) 3.5 (Min.)

The asphalt concrete wearing course mixture shall meet the following Marshal Test Criteria:

Compaction, number of blows each end of specimen	75
Stability	1000 Kg (Min)

Flow, 0.25 mm (0.01 inch) 8-14

Percent air voids in mix 4-7

Percent voids in mineral aggregates according to table 5.3 MS-2

(Asphalt Institute - USA), sixth

addition, 1993.

Loss of Stability 20% (Max.)

305.2.4 Job Mix Formula

At least one week prior to production, a Job-Mix Formula (JMF) for the asphaltic wearing course mixture or mixtures to be used for the project, shall be established jointly by the Engineer and the Contractor.

The J MF shall be established by Marshall Method of Mix Design according to the procedure prescribed in the Asphalt Institute Manual Series No. 2 (MS-2), sixth edition 1993 or the latest Edition.

The JMF, with the allowable tolerances, shall be within the master range specified in Table 305-1. Each JMF shall indicate a single percentage of aggregate passing each required sieve and a single percentage of bitumen to be added to the aggregates.

The ratio of weight of filler (Passing No. 200) to that of asphalt shall range between 1 - 1.5 for hot climate areas with temperature more than 40 °C.

After the JMF is established, all mixtures furnished for the project represented by samples taken from the asphalt plant during operation, shall conform thereto with the following ranges of tolerances:

Combined aggregates -gradation

Retained No. 4 and larger	\pm 7.0%
Passing No. 4 to No. 100 sieves	\pm 4.0%
Passing No. 200	\pm 1.0%

Asphalt Content

Weight percent of total mix	\pm 0.3%
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In addition to meeting the requirements specified in the preceding items, the mixture as established by the JMF shall also satisfy the following physical property:

Loss of Marshall Stability by immersion of specimen in water at sixty (60) degree C. for twenty four (24) hours as compared with the stability measured after immersion in water at sixty (60) degree C. for twenty (20) minutes shall not exceed twenty (20) percent. If the mixture fails to meet this criterion, the JMF shall be modified or an anti-stripping agent shall be used.

Should a change of sources of materials be made a new Job Mix Formula shall be established before the new material is used. When unsatisfactory results or other conditions make it necessary, a new Job Mix Formula will be required.

305.3 CONSTRUCTION REQUIREMENTS

Construction requirements for this Item shall conform with the same as specified for Asphaltic Concrete Base Course Plant Mix under Item 203.3, except as modified in the following sub-items.

305.3.1 Preparation of Base Course Surface

Before spreading materials, the surface of the previously constructed and accepted base course on which the mix is to be placed shall be conditioned by application of a tack coat, if directed by the Engineer

305.3.2 Pavement Thickness and Tolerances

The asphalt concrete wearing course shall be compacted to the desired level and cross slope as shown on the drawing or as directed by the Engineer.

The tolerances in compacted thickness of the wearing course shall be ± 3 mm from the desired thickness shown on the drawings. For determination of thickness one (1) core per hundred meters of each lane will be taken. If the thickness so determined is deficient by more than three (3) mm, but not more than ten (10) mm, payment will be made at an adjusted price as specified in table-1, clause 305.4.2.(2) of this specification.

The surface of the wearing course shall be tested by the Engineer using a 5 meters straightedge at selected locations. The variation of the surface from the testing edge of the straightedge between any two contacts, longitudinal or transverse with the surface shall at no point exceed five (5) millimeters. The cross fall (camber) shall be with + 0.2 percent of that specified, and the level at any point shall be within + three (3) mm of the level shown on the Drawings. All humps or depressions exceeding the specified tolerance shall be corrected by removing the defective work and replacing it with new material, by overlaying, or by other means satisfactory to the Engineer.

305.3.3 Acceptance Sampling and Testing

Acceptance of sampling and testing for this Item with respect to materials and construction requirements, not specified herein, shall be in accordance with the relevant, Tables for Sampling and Testing Frequency" in these specifications.

305.4 MEASUREMENT AND PAYMENT**305.4.1 Measurement**

The quantities of Asphaltic wearing course shall be measured by volume in CM. laid and compacted in place. Measurements shall be based on the dimension as shown on plans or as otherwise directed or authorized by the Engineer. A tolerance of + three (3) mm shall be allowed in compacted thickness of wearing course. However, any asphalt in excess of 3 mm shall not be paid and any layer deficient by more than 3 mm but not exceeding 10 mm shall be paid as per clause 305.4.2 (2) of this specification.

The quantity of bitumen material used is included in the asphalt concrete mixture and will not be measured separately.

Quantities of Bitumen or asphaltic concrete wasted or remaining on hand after completion of the work shall not be measured or paid for.

305.4.2 Payment

- 1) The quantity determined as provided above shall be paid for at the contract unit price respectively for each of the particular pay items listed below and shown in the Bill of Quantities , which prices and payment shall constitute full compensation for all the costs necessary for the proper completion of the work prescribed in this item. Asphalt additive or antistripping agent, if allowed and used to meet with JMF requirement shall not be paid directly, payment shall be deemed to be included in the respective pay items of Asphaltic wearing course.
- 2) **Price adjustment.** If the thickness determined as per clause 305.3.2 of this specification is deficient by more than three (3) mm, but not more than ten (10) mm, payment will be made at an adjusted price as specified in table-1 below: -

Table - 1

Deficiency in thickness as determined by cores	Proportional Rate of contract Price allowed
0.0 mm to 3.0 mm	100%
3.1 mm to 5.0 mm	90%
5.1 mm to 10.0 mm	80%

When wearing course is more than ten (10) mm deficient in thickness, the contractor shall remove such deficient areas and replace them with wearing course of an approved quality and thickness or the contractor may opt to place an additional layer of wearing course asphalt, grading with a minimum thickness of 35 mm. The contractor will receive no compensation for the above additional work.

Alternately, the Contractor may choose to overlay the area in a thickness of 30 mm (min.) with smooth transition as approved by the Engineer on either side with no extra compensation.

Pay Item	Description	Unit of
<u>No.</u>		<u>Measurement</u>
305a	Asphaltic Concrete for Wearing Course (Class A)	CM
305 b	Asphaltic Concrete for Wearing Course (Class B)	CM

ITEM 607 TRAFFIC ROAD SIGNS AND SAFETY DEVICES

607.1 DESCRIPTION

This work shall comprise furnishing and installing traffic signs, permanent safety devices and post assemblies in accordance with these specifications and to the details shown on the Drawings. All sign faces and lettering shall be in accordance with NHA / NTRC sign standards or as shown on plans. Prior to manufacture and fabrication of the signs the contractor shall submit to the Engineer for approval detailed drawings showing letter sizes, traffic symbols and sign layout. The permanent safety devices shall consist of road posts and hazard markers and will be provided as per specifications, drawings or as directed by the Engineer.

607.2 MATERIAL REQUIREMENTS**607.2.1 Sign Panel**

Sign panels for regulator, warning and informative signs shall be manufactured from aluminium alloy conforming to ASTM B 209, alloy 6061T6 or 5052 - H38 plates of three (3) mm thickness as shown on the drawings.

The blanks shall be free from laminations, blisters, open seams, pits, holes, or other defects*that may affect their appearance or use. The thickness shall be uniform and the blank commercially flat. Perform shearing, cutting and punching before preparing the blanks for application of reflective material.

The blanks shall be cleaned, degreased, and chromate or otherwise properly prepared according to methods recommended by the sheeting manufacturer.

607.2.2 Reflective Sheeting

Reflective sheeting used on road sign made of flexible white or colored, wide angle retroreflective sheeting (herein after called sheeting), and related processing materials designed to enhance night time visibility. The sheeting shall consist of optical elements adhered to a synthetic resin and encapsulated by a flexible transparent plastic that has a smooth outer surface.

The sheeting shall have either a precoated pressure sensitive adhesive or a tack-free adhesive activated by heat applied in a heat vacuum applicator in a

manner recommended by the sheeting manufacturer. Both adhesive classes shall be protected by an easily removable liner.

The manufacturer of the sheeting being offered shall furnish the process inks, clears and thinners produced by the sheeting manufacturer recommended for and compatible with the sheeting to meet the performance requirements of this specification and shall further be responsible for technical assistance in the use of these inks or alternatively sheeting can be used on sheeting.

The sheeting manufacturer must provide documented evidence to the satisfaction of the Engineer that representative production materials of the type to be supplied has been used successfully in a substantial traffic signing program in similar climatic conditions for at least three years.

a) Color Requirements. Color shall be specified and conform to the requirements of Table 1.

Table – 1

Color Specification Limits* and Reference Standards

Color	Reflectance										Paper
	X	Y	X	Y	X	Y	X	Y	Min.	Max.	
White	.303	.287	.368	.353	.340	.380	.274	.316	27.0	-	5PB 7/1
Yellow	.498	.412	.557	.442	.479	.520	.438	.472	15.0	40.0	1.25Y 6/12
Red	.613	.297	.708	.292	.636	.364	.558	.352	2.5	11.0	7.5R 3/12
Blue	.144	.030	.244	.202	.190	.247	.066	.208	1.0	10.0	5.8 PB 1.32/6.8
Orange	.550	.360	.630	.370	.581	.418	.516	.394	14.0	30.0	2.5YR 5.5/14
Brown	.430	.340	.430	.390	.550	.450	.610	.390	3.0	9.0	5YR 3.6
Green	.30	.380	.166	.346	.286	.4288	.201	.776	3.0	8.0	10G 3/8

* The four pairs of

chromaticity coordinates determine the acceptable color in terms of the CIE 1931 standard colormetric system measured with standard illumination Source C

** Available from Munsell Color Company, 2441 Calvert Street, Baltimore, Maryland 21218. Catalog No. MCP-90040.

- b) **Coefficient of Retroreflection.** The coefficients of retroreflection shall conform to the minimum requirements of Table 11.

Table II
Minimum Coefficient of Retroreflection
(Candelas per Footcandle per Square Foot)

Observation Angle (o)	Entrance Angle (o)	White	Red	Yellow	Green	Blue	Brown	Orange
0.2	-4	250	45	170	45	20.0	12.0	100.0
0.2	+30	150	25	100	25	11.0	8.5	60.0
0.5	-4	95	15	62	15	7.5	5.0	30.0
0.5	+30	65	10	45	10	5.0	3.5	25.0

For screen printed transparent colored areas on white sheeting, the coefficients of retroreflection shall not be less than 70% of the values for corresponding color in the above table.

The sheeting manufacturer shall provide a test report from British Standards Institution (BSI) or any internationally recognised laboratory stating that the sheeting meets the requirements according to BSI 873 Part 6. or FP 92 of FHWA.

The brightness of the reflective sheeting totally wet by rain, shall be at least ninety (90) % of the above values.

The reflective sheeting shall be sufficiently flexible as to permit application over and adhesion to a moderately embossed surface. It shall not show damage when bent ninety (90) degree over a fifty (50) mm diameter mandrill.

The sheeting shall show no cracking or reduction in reflection after being subjected to the dropping of a twenty five (25) mm diameter steel ball from a height of two (2) meters onto its surface.

For heat activated material the adhesive shall permit the reflective sheeting to adhere securely forty eight (48) hours after application, at temperatures of up to ninety (90) degree Centigrade.

The reflective material shall be weather-resistant and following cleaning, shall show no definite fading, darkening, cracking, blistering or peeling and not less than seventy five (75) % of the specified wet or dry minimum brightness values when exposed to weathering for five (5) years.

c) **Performance Requirements And Obligation.** The sign manufacturer shall submit a certificate from the sheeting manufacturer stating that the sheeting used for finished retroreflective signs meets all requirements listed herein.

Sheetings processed and applied to sign blank materials in accordance with sheeting manufacturer's recommendation, shall perform effectively for the number of years stated in Table III of this specification. The retroreflective sheeting will be considered unsatisfactory if it has deteriorated due to natural causes to the extent that: (1) the sign is ineffective for its intended purpose when viewed from a moving vehicle under normal day and night driving conditions; or (2) the coefficient of retroreflection is less than the minimum specified for that sheeting during that period listed in Table III.

Table III

Minimum Coefficient of Retroreflection Candelas per Foot

Candle per Square Foot (.20 OBS, and -40 Entrance)*

Sheeting Color	Minimum Coefficient of Retroreflection (7 Years)	Minimum Coefficient of Retroreflection (10 Years)
White	212	200
Yellow	144	136
Green	38	36
Red	38	36
Blue	17	16
Brown	10	09

For screen printed transparent colored areas on white sheeting, the coefficients of retroreflection shall not be less than 50% of the values for the corresponding color in the above table.

All measurements shall be made after sign cleaning according to sheeting manufacturer's recommendations.

Where it can be shown that retroreflective traffic signs supplied and used according to the sheeting manufacturer's recommendations have not met the performance requirements above the sheeting manufacturer shall cover restoration costs as follows for sheetings shown to be unsatisfactory during.

- a) The entire seven years the sign manufacturer and sheeting manufacturer will replace the sheeting required to restore the sign surface to its original effectiveness.
- b) In addition, during the first five years sign manufacturer and sheeting manufacturer will cover the cost of restoring the sign surface to its original effectiveness at no cost to the NHA for materials and labor.

Samples of the reflective sheeting shall be approved by the Engineer prior to the Contractor placing his order.

607.2.3**Metal Posts**

Wide flange of 10 x 10 centimeters metal posts shall be fabricated from structural steel conforming to the Specifications of ASTM A 283 Grade D.

In lieu of wide flange steel posts the Contractor may use tubular steel posts of minimum internal and external diameters of sixty three (63) mm and seventy five (75) mm respectively conforming to the specifications of ASTM A 501.

All posts shall be thoroughly cleaned, free from grease, scale and rust, and shall be given one coat of rust inhibitive priming paint and two coats of grey paint. Length of the posts shall be such that their top flushes with the top of the sign penal, where as bottom of sign panel is at least hundred and eighty (180) centimeters above shoulder level.

607.2.4**Plates**

- a) Plates shall be non-porous, smooth, flat, rigid, weather proof and shall not rust or deteriorate otherwise.

It shall be so cut that there are no sharp edges and that the corners are rounded off to a radius of thirty seven and half (37.5) mm. Any trade mark or other printing shall be carefully removed with liquid thinner.

- b) The High Intensity Grade sheeting for the background should cover the whole area of the sign plate.
- c) Prior to application of the High Intensity Grade reflective sheeting, the sign plate shall be cleaned and shall be wax-free. They shall be degreased by vapour or by alkaline immersion and etched by scrubbing with abrasive cleaner. The plate shall be rinsed thoroughly and dried with hot air before applying the sheets.
- d) The sheeting after application to the sign base shall not come off the edges, which shall be sealed, nor shall it peel off nor warp. The surface shall be smooth and free from any bubbles, pimples, edge chipping or edge shattering. It shall be washable and weather-proof.

607.2.5**Nuts and Bolts**

All Nuts and bolts and metal washers shall be of heavily galvanized quality ten (10) mm dia (G.I.) or aluminium alloy. The bolt heads to be such that they do not protrude out too much nor show very much on the front face of the plate. The heads should be flush with the plate face and covered with sheeting galvanised according to ASTM A 153.

607.2.6**Rubber Washer**

All rubber washers shall have thick walls and shall not get dry and brittle when exposed to weather at the site after they are in position during the life of the sign.

607.2.7**Caps over the pines**

These can be of heavy plastic or of aluminium well fitted so that they cannot be removed, any good adhesive can be used.

607.2.8**General**

- a) Very large signs need not be made of one piece; in that case extended Aluminium panels shall be used or the various pieces of sheet shall be joined by angle-irons in anticorodal materials, and, if necessary, with connecting cross pieces in order to ensure the solidity of the joint and with slanting struts embedded in the concrete as directed by the Engineer.
- b) All the nuts and bolts and metal washers must be heavily galvanized, or may be of stainless steel of high quality.
- c) Relevant holes to receive ten (10) mm bolts shall be drilled into the pipes and the plates and not punched. These to be drilled through the plates before the application of scotchlite.
- d) After the plates are fixed with nuts and bolts, the nuts shall be Tack Welded to the bolts against pilferage.

607.2.9**Concrete Foundation Blocks**

The concrete for the foundation blocks shall be in situ Class A in accordance with Item 401.1.1 and shall of the size 450 x 450 x 650 mm for category 1 & 2 and 600 x 600 x 750 mm for category 3.

607.2.10**Road Posts and Hazard Markers**

The road posts and hazard markers used as permanent safety devices shall conform fully, with the requirements of the statutory instruments, current British standards and chapter four (4) of the Traffic signs manual. The safety devices shall consist of delineators and detours of verge master, flex master, edge master, passing place post, and chevoflex etc. and will be manufactured from highly durable tough plastic material withstanding vehicular impact. These shall be of High Intensity Grade reflective sheeting for maximum visibility by both day and night and consequently be resistant to impact, damage and vandalism.

607.3 CONSTRUCTION REQUIREMENTS

607.3.1 Excavation and Backfilling

Holes shall be excavated to the required depth of the bottom of the concrete foundation as shown on the Drawing.

Backfilling shall be carried out by using the surplus excavated material if approved by the Engineer and shall be compacted in layers not exceeding fifteen (15) cm in depth.

Surplus excavated material shall be disposed of by the Contractor as directed by the Engineer

607.3.2 Erection of Posts

The posts shall be erected vertically in position inside the formwork of the foundation block prior to the placing of the concrete and shall be adequately supported by bracing to prevent movement of the post during the setting process of the concrete. The posts shall be located at the positions shown on the Drawings.

607.3.3 Sign Panel Installation

Sign panels shall be installed by the Contractor in accordance with the details shown on the Drawings. Any chipping or bending of the sign panels shall be considered as sufficient cause to require replacement of the panels at the Contractor's expense.

The exposed portion of the fastening hardware on the face of the sign shall be painted with enamels matching the background colour.

All newly erected traffic road signs shall be covered with burlap or other material until their uncovering is ordered by the Engineer.

607.3.4 Categories of Signs

Traffic road signs shall be of three categories according to type of construction

a) Warning Signs

Constructed with single post and sign of equilateral triangle shape, as shown in drawings. category 1.

b) Regulatory Signs

Constructed with single post and sign of circular shape, as shown in the drawings. category 2.'

c) Informatory Signs

These signs shall be rectangular in shape and constructed with one, two or three numbers of posts or as shown on the drawings. Dimensions may vary according to the requirements, however total area of sign shall be as under:-

Category 3 a = One Sq. meter

Category 3 b = Two Sq. meter

Category 3 c = As shown on drawings

d) Additional Panel

If any panel is required to be installed, it shall be of the sizes 60x30 cm or 90x30 cm.

607.3.5

Installation of Safety Devices

Safety devices comprising of road posts, delineators of various types, fixed 1 portable safety barriers and hazard markers e.g. verge-master, flex-master chevoflex, bigmax, edgemaster and passing place post and other etc., shall be installed in accordance with the techniques and methods laid down in the manufacturer's manual or guide and in conformity to the line and level and locations shown on the drawings or as directed by the Engineer to ensure maximum visibility and safety, even in adverse weather conditions. These shall be constructed strictly with the specifications and full assistance by the manufacturer for installation with precision. These safety devices shall be used as delineators at sharp curves of highways verges, high embankments, culverts, bridges, as a visual

and physical deterrent for a prohibiting car parking on grass verges and protecting kerb-side areas on public and private roads.

607.3.6

Sign Faces

a) Design

All sign faces shall be of the type, colour, design and size as shown in the plans. Size and spacing of letters shall be as under:

1. The Urdu writing shall be in "Persian" character.
2. The Urdu and English writing shall be about the same in length width and spacing.
3. English letters are to be in italics except the first letter of the word, which is to be in capital.
4. Height of Capital letters 21 cm
5. Height of italics letters 17 cm
6. Stroke Width and Width of border 3.5 cm
7. Space between words and border (at least) 5 cm
8. Space between Words 5 cm
9. Space one line will occupy 4 cm
10. Space between digits of numerals 4 cm
11. Height of numerals same as

capital letters	23 cm
12. Space between lines (at least)	5 cm
13. Size of letter for km. Height	K-23 cm m-8 cm
14. Width of letters for km including spacing	K-8 m-9.6 cm
15. Width of dividing line	2.0 cm
16. The size and spacing for Urdu letter and Words will generally conform to the dimensions shown above for English letters.	
17. The spelling of place names in Urdu and in English shall be as written in the Survey of Pakistan, maps.	

b) Shop Drawings

The contractor shall submit to the Engineer for approval, three (3) copies of drawings for all special sign faces and all sign faces bearing messages, showing the design and / or arrangement and spacing of both the Urdu and English sign messages. Official town names and their spelling shall be as provided by the Engineer. Size and style of lettering shall be as shown on the plans or as otherwise approved by the Engineer.

607.3.7

Storage of Signs

'Signs delivered for use on a project shall be stored off ground and under cover in a manner approved by the Engineer. Any signs damaged, discolored or defaced during transportation, storage or erection shall be rejected

607.4 MEASUREMENT AND PAYMENT**607.4.1 Measurement**

The quantities of traffic road signs and safety devices to be paid for shall be measured in number of each category of sign supplied and installed at site as directed by the Engineer.

607.4.2 Payment

The quantities measured as determined above shall be paid for at the contract unit price for the pay items listed below, and as shown in the Bill of Quantities which price and payment shall be full compensation for furnishing all labour, materials, tools, equipment, and for excavation, concreting, backfilling and erection of posts, installation of sign panels and all incidental costs including sheeting / painting necessary to complete the work as prescribed in this item.

Pay Item No.	Description	Unit of Measurement
607a	Traffic Road Signs Category 1, size-	Each
607b	Traffic Road Signs Category 2, size-	Each
607c	Traffic Road Signs Category 3, (a)	Each
607d	Traffic Road Signs Category 3 (b)	Each
607e	Traffic Road Signs Category 3 (c)	SM
607f	Additional panel size 60 x 30 cms	Each
607g	Additional panel size 90 x 30 cms	Each
607h	Road Posts and Hazard Markers	Each

ITEM 608 PAVEMENT MARKING

608.1 DESCRIPTION

This work shall consist of furnishing non reflective or reflective chlorinated rubber based or thermoplastic paint material or retroreflective preformed pavement marking (tape) whichever is called for in the Special Provisions and shown in the Bill of Quantities, for sampling and packing, for the preparation of the surface and for the application of the paint to the pavement surface all in accordance with these Specifications.

The paint shall be applied in conformance to the size, shape and location of the markings as shown in the Drawings.

608.2 CHLORINATED RUBBER PAINT**608.2.1 Material Requirements**

A standard and acceptable quality of Chlorinated Rubber based paint shall be used. The paint shall be ready for application and shall be of a smooth quality. The paint shall be homogeneous, well dispersed to a smooth consistency and shall not cake, liver, thicken, curdle, gel, settle badly or show any objectionable properties after period of storage not to exceed six (6) months.

Composition

a) White Traffic Paint			
i)	Pigment	Titanium Dioxide Rutile and Extenders	100%
ii)	Vehicle	Modified Chlorinated Rubber	52 \pm 4
		Solvents	45 \pm 4
		Additives i.e. Flow levelling, adhesion improving agents, anti-oxidants, siccatives etc.	1 – 3%
iii)		Pigments	

	Paint Composition	Vehicle, Solvent and Additives	55 \pm 4% by Weight
b) White Traffic Paint			
i)	Pigment	Chrome Yellow and Extenders	100%
ii)	Vehicle	Same as for white traffic paint	55 \pm 4 by Weight
iii)	Paint Composition	Pigments Vehicle, Solvent and Additives	45 \pm 4% by Weight
b) White Traffic Paint			
i)	Pigment	Chrome Black and Extenders	100%
ii)	Vehicle	Same as for white traffic paint	55 \pm 4 by Weight
iii)	Paint Composition	Pigments Vehicle	45 \pm 5% by Weight

The volatile material shall be of such character that has a minimum solvent action of asphalt, and such that the resins and non-volatile components will be entirely dissolved in the volatile material, and will not precipitate from the solution on standing. The non-volatile material shall be of such quality that it will not darken or become yellow when a thin section is exposed to the sunlight.

Other pavement marking paint may be submitted by the Contractor as an alternative to the above, for the approval of the Engineer.

608.2.1.1 Ballotini for Reflective Road Paint

The grading of ballotini dispersed in the paint shall be as follows:

Sieve Sizes	Percentage Retained
--------------------	----------------------------

No. 12	0
No. 20	30
No. 30	50
No. 50	80
No. 80	100

Glass beads shall conform with AASHTO Designation M-247. At least ninety (90) percent glass beads shall be transparent, reasonable spherical and free from flaws.

The proportion of ballotini to paint shall be not less than five hundred (500) grams per litre of paint.

608.2.2 Photometric Requirements for Reflective Road Paint

Other reflective road paints may be considered for use by the Engineer provided they have minimum brightness values at two tenth (0.2) degree and half (0.5) degree divergence expressed as candle power per meter per square meter of surface coating, as follows:

Co 1 o u r.

White Yellow

Divergence Angle	(Degree)	0.2	0.5	0.2	0.5
Incidence Angles	4(Degree)	237	118	129	75
Incidence Angles	40(Degree)	75	43	43	32

608.2.3 CONSTRUCTION REQUIREMENTS

Traffic markings shall be applied with approved equipment capable of applying the paint at the specified width and at the specified rate of application. In no case shall the contractor proceed with the work until the equipment, method of application and rate of application as established by a test section have been approved by the Engineer

The painting of lane markers and traffic strips shall include the cleaning of the pavement surfaces, the application, protection and drying of the paint coatings, the protection of pedestrians, vehicular or other traffic on the pavements, the protection of all parts of the road, structures or appurtenances against disfigurement by spatters, splashes or smirches of paint or of paint materials, and the supplying of all tools, labour and traffic paint necessary for the entire work.

The paint shall not be applied during rain, wet weather, when the air is misty, or when, in the opinion of the Engineer, conditions are otherwise unfavourable for the work. Paint shall not be applied upon damp pavement surfaces, or upon pavements which have absorbed heat sufficient to cause the paint to blister and produce a porous paint film.

The application of paint shall preferably be carried out by a purpose-made machine but where brushes are used only round or oval brushes not exceeding 10 cm. in width will be permitted. The paint, when applied, shall be so applied as to produce a uniform, even coating in close contact with the surface being painted.

Traffic paint shall be applied to the pavement at a rate of one (1) litre to two and half (2.5) square meters or less. Contractor shall provide adequate arrangements that applied paint is not disfigured by moving traffic, till its complete drying and sticking to road surface.

608.3 HOT-APPLIED THERMOPLASTIC ROAD PAINTS

608.3.1 Material Requirements

608.3.1.1 Aggregate

The aggregate shall consist of light coloured silica sand, calcite, quartz, calcined flint, or other material approved by the Engineer.

608.3.1.2 Pigment and Extender

a) White Material

The pigment shall be titanium dioxide complying with the requirements of Type A (anatase) or Type R (rutile) of BS 1851.

b) Yellow Materials

Sufficient suitable yellow pigment shall be substituted for all or part of the titanium dioxide to comply with the other requirements of this specification.

c) All Materials

The extender shall normally be whiting (i.e. calcium carbonate prepared from natural chalk) complying with the requirements of BS 1795. The manufacturer may substitute lithopone complying with the requirement of BS 296 for any or all of the whiting.

d) Binder

The binder shall consist of synthetic hydrocarbon resin, or, with the approval of the Engineer, gun or wood resin, plasticized with mineral oil.

e) Composition of mixture.

The proportions of the constituents of the mixed material as found on analysis shall comply with the requirements of Table 1.

Table 1

Proportions of Constituents of Mixture

Constituent	Percentage by Mass of Total Mixture	
	Minimum	Maximum
Binder (Resin & Oil)	18	22
Pigment	6*	-
Pigment and Extendor	18	22
Ballotini	20	-
Aggregate		
Pigment	78	82
Extender & Ballotini		

*For titanium dioxide only. No minimum is specified for yellow material.

Where specified, 10% in the case of material to which surface ballotini is to be applied by pressure application.

The grading of the combined aggregate, pigment, extender and ballotini (where specified) as found on analysis shall comply with the requirements of table 2.

Table – 2

Grading of Combined Aggregate, Pigment,

Extender and Ballotini

Sieve	Percentage by Mass Passing Sprayed
2.80 mm	100
600 mm	75 – 95

608.3.2

Sampling and Testing

• **Sampling**

For the purpose of carrying out the testing, it is essential that adequate and representative samples be taken in the manner prescribed in specification BS 3262 at following stages.

- a) At the manufacturer's plant.
- b) After it has been re-melted by the road application contractor.

608.3.3.2

Testing

The samples shall be prepared and tested in accordance with B.S. Specification 3262 (1976) appendix A to H. The test results shall conform the following properties.

• **Softening Point**

The softening point measured in accordance with appendix C shall be not less than 65°C.

- **Colour and luminance**

- a) White Material**

The luminance factor of white material as delivered by the manufacturer shall be measured in accordance with appendix D and shall not be less than 70 whereas the luminance factor of material obtained from an applicator or melter on site after re-melting measured in accordance with appendix D shall not be less than 65.

- b) Yellow Material**

The Colour of yellow material shall be approximately BS 381 C Colour No. 355, Lemon. The luminance factor of yellow material as delivered by the manufacturer shall be not less than 60 whereas the luminance factor of material obtained from an applicator or melter on site after re-melting measured in accordance with appendix D shall not be less than 55.

- **Heat Stability**

- a) White Material**

When tested in accordance with appendix E, the luminance factor of white material as measured in accordance with appendix D shall be not less than 65.

- b) Yellow Material**

When tested in accordance with appendix E, the luminance factor of yellow material as measured in accordance with appendix D shall be not less than 55.

- **Flow Resistance**

In testing the flow resistance, a cone made and tested in accordance with appendix F, shall not slump by more than 25%.

- Skid Resistance**

When tested in accordance with appendix G, the skid resistance of a newly laid marking prepared under the stated conditions shall be not less than 45.

608.3.3 Manufacturing, Packing, and Storing of Paint**608.3.3.1 Manufacturing**

The paint shall be produced in a plant owned and operated by the manufacturer following a process which has been used by the manufacturer for at least five (5) years to produce paint. The equipment for mixing and grinding shall be clean, modern, and in good condition.

608.3.3.2 Packing

- The material shall be supplied in sealed containers which do not contaminate the contents and which protect them from contamination.
- Each container shall be clearly and indelibly marked with the manufacturer's name, Batch number, date of manufacture, reflectorisation (if applicable), colour, chemical type of binder and maximum safe heating temperature.

608.3.3.3 Storing

The material shall be stored in accordance with the manufacturer's instructions and any material that is in damaged containers of which the seal has been broken, shall not be used.

608.3.4 Certification

The Contractor shall furnish a certificate from manufacturer that the material he proposes to use has the required properties, stating the maximum and minimum proportions and grading of the constituents, the acid value of the binder, the setting time, the maximum safe heating temperature, the temperature range of the apparatus and the proposed method of laying.

608.3.5 Application of Material to the Road**a) Preparation of Site**

The thermoplastic paint shall only be applied to surfaces, which are clean and dry. Immediately before the application of paint, the surface shall be cleaned with mechanical broom, compressed air or other approved means to remove surplus asphalt, oils, mud, dust and other loose or adhered material. The material shall not be applied if the road surface is at a temperature of less than 50 C.

b) Preparation of Material on Site

The material shall be melted in accordance with the manufacturer's instructions in a heater fitted with a mechanical stirrer to give a smooth consistency to the thermoplastic material and such that local overheating will be avoided. The temperature of the mass shall be within the range specified by the manufacturer, and shall on no account be allowed to exceed the maximum

temperature stated by the manufacturer. The molten material shall be used as expeditiously as possible, and for thermoplastic material, which has natural resin binders or is otherwise sensitive to prolonged heating, the material shall not be maintained in a molten condition for more than 4 hours.

- After transfer to the laying apparatus, the material shall be maintained within the temperature range specified by the manufacturer and stirred to maintain the right consistency for laying.
- On concrete carriageway, a tack coat compatible with the marking material shall be applied in accordance with the manufacturer's instructions prior to the application of thermoplastic material.

c. Laying

Carriageway centre lines, lane lines and edge lines shall be laid to a regular alignment by self propelled machine. Other markings may be laid by hand, hand propelled machine or self propelled machine as approved by the Engineer. The surface produced shall be uniform in texture and thickness and appreciably free from blisters and streaks.

d) Reflectorization by surface Application

When surface application of ballotini is required, additional ballotini (400 9/M2 to 500 91M2 from the machine) shall be applied by pressure concurrently with the laying of the line with sufficient, velocity to ensure retention in the surface of the line. The ballotini so sprayed shall give uniform cover and immediate reflectivity over the whole surface of the marking.

Ballotini dispensed on the surface of the markings shall conform to the following grading.

Sieve	Percentage by Mass Passing
1.7mm	100
600 μ	80 – 100
425 μ	45 – 100
300 μ	10 – 45
212 μ	0 – 25
75 μ	0 - 5

Not less than 90%, by mass of the ballotini, shall be of transparent glass, spherical in shape and not more than ten (10) percent shall be ovate in shape or have other flaws. The ballotini shall be made of soda glass.

e) Thickness

Unless otherwise approved by the Engineer, the material shall be laid to the following thicknesses.

- a) Sprayed lines other than yellow. Not less than 1.5 mm.
- b) Sprayed yellow edge lines not less than 0.8 mm.

The minimum thicknesses specified are exclusive of surface applied ballotini. The method of thickness measurement shall be in accordance with appendix H of BS 3262 (1976).

608.3.6**Trial Section**

In no case shall the contractor proceed with the work until the equipment, method of application and rate of application conforming the required thickness (as established by a test section) have been approved by the Engineer.

608.4**RETROREFLECTIVE PREFORMED PAVEMENT MARKINGS****608.4.1****Materials - Requirements**

The performed markings shall consist of white or yellow films with pigments selected to conform to standard highway colours. Ceramic and glass beads shall be incorporated to provide immediate* and continuing retroreflection. Ceramic skid particles shall be bonded to a top urethane layer to provide a skid resistant surface.

The preformed markings shall be capable of being adhered to asphalt cement concrete (ACC) or Portland Cement Concrete (PCC) by a precoated pressure sensitive adhesive. A primer may be used to precondition the pavement surface. The preformed marking film shall mold itself to pavement contours by the action of traffic. The pavement marking film wearing courses during the paving operation in accordance with the manufacturer's instructions, approved by the Engineer. Following proper application and tamping, the markings shall be immediately ready for traffic. The bidder, when bidding, shall identify proper solvents and / or primers (where necessary) for proper application, and recommendation for application that will assure effective product performance. The preformed markings shall be suitable for use for one year after the date of receipt when stored in accordance with the manufacturer's recommendations.

The marking film shall be durable retroreflective plisot polymer pavement marking film for performed longitudinal markings subject to low to medium traffic volumes and moderate wear conditions such as repeated shear action from crossover or encroachment on channelization lines.

The retroreflective pavement marking film shall consist of mixture of high quality pigmented polymeric materials, with a reflective layer of ceramic and glass beads, and a layer of skid resistant ceramic ' particles bonded to the top urethane wear surface. The film shall have a pre-coated pressure sensitive adhesive. The edges of the preformed tape shall be clear cut and true.

608.4.2**Colour**

The daytime colour of the white film shall provide a minimum initial Luminance factor, Y, of 80, and shall conform to the following chromaticity requirements: X = 0.290, Y = 0.315; X = (Y.491, Y = 0.435; X = 0.512, Y=0.486; X = 0536, Y = 0.463.

Measurements shall be made in accordance with ASTM E 1349, using illuminate "C" and 0145 (4510) geometry. Calculations shall be in accordance with ASTM E 308 for the 20 standard observer.

608.4.3**Reflectance**

The white and yellow films shall have the following initial minimum reflectance values as measured in accordance with the testing procedures .of ASTM D 4061. The photometric quantity to be measured shall be specific luminance (SQ, and shall be expressed as millicandals per square foot per foot-candle (mcd. ft⁻²) ft⁻¹). The metric ' equivalent shall be expressed as millicandals per square meter per lux (mcd. M⁻²). 1X⁻¹)

	White	Yellow
Entrance Angle 86.00°	86.5 °	86.5 °
Observation Angle	1.0 °	1.0 °
Specific Luminance SL [(mcd. ft ⁻²). ft ⁻¹]	300	175

608.4.4**Skid Resistance**

The surface of the retroreflective films shall provide an initial minimum skid resistance values of 55 BPN as measured by the British Portable Skid Tester in accordance with ASTM E 303.

608.4.5**Patchability**

The pavement marking film shall be capable of use for patching worn areas of the same type of film in accordance with the manufacturer's instructions.

608.4.6**Reflectance Retention**

To have a good, effective performance life, the ceramic and glass beads must be strongly bonded and not be easily removed by traffic wear. The following test shall be employed to measure reflectivity retention.

608.4.6.1 Taber Abraser Simulation Test

Using a Taber Abraser with an H-1 8 wheel and a 125 gram load, the sample shall be inspected at 200 cycles, under a microscope, to observed the extent and type of bead failure. No more than 15% of the beads shall be lost due to popout and the predominant mode of failure shall be "wear down" on the beads.

608.4.7**Beads**

The size, quality and refractive index of the ceramic and glass beads shall be such that the performance requirements for the marking shall be met. The bead adhesion shall be such that beads are not easily removed when the material surface is scratched.

608.4.8**Bead Retention**

The film shall be ceramic and glass bead retention qualities such that when a 2 in x 6 in. (5.08 cm x 15.24 cm) sample is bent over a 112 in. (1.27 cm) diameter-mandrel, with the 2 M. dimension perpendicular to the mandrel axis, microscopic examination of the area on the mandrel shall show no more than 10% of the beads with entrapment by the binder of less than 40%.

608.4.9**Thickness**

The film without adhesive, shall have a minimum thickness of 0.030 in (0.76mm).

608.4.10**Effective Performance Life**

The film, when applied according to the recommendations of the manufacturer, shall provide neat, durable marking that will not flow or distort due to temperature if the pavement surface remains stable. The film shall be weather resistant and through normal traffic wear shall show no fading, lifting or shrinkage which will significantly impair the intended usage of the marking throughout its useful life and shall show no significant tearing, roll back or other signs of poor adhesion.

608.4.11**Installation**

The markings shall be applied in accordance with the manufacturer's instructions.

608.5**CEMENTATIONS MARKING COMPOUND**

Cementitious marking compound shall be used for Concrete, Surface Dressing and Bitumen to provide enhanced night and wet, weather visibility. This compound will be applied at following locations:

- Kerbs - Pavements and car park areas.
- Roundabout - vertical and sloping faces.
- Traffic Islands - vertical edges and bull noses, etc.
- Traffic Dividers - black and white chevrons.
- Concrete wall and faces - on high speed intersections and traffic merging.

608.5 MEASUREMENT AND PAYMENT**608.5.1 Measurement**

The quantity of non-reflective or reflective chlorinated rubber based or thermoplastic pavement marking paint, shall be the no. of linear meters of painted traffic line for the specified width as indicated in BOQ. The retroreflective preformed pavement markings (tape) shall be measured in square meters. The arrows shall be measured in number.

The measurement shall be made of painted areas, completed and accepted. No measurement shall be made of unauthorized areas. Paint that is applied in un-authorized areas shall be completely removed from the surface of the road to the satisfaction of the Engineer and at Contractor's expense.

608.5.2 Payment

The quantities measured as determined above shall be paid for at the Contract unit price respectively for the pay items listed below, which price and payment shall constitute full compensation for furnishing and placing all materials including sampling, packing and testing at approved laboratory. The cost shall also include the preparation of the surface, and for all other costs necessary to complete the work as prescribed in this item.

Pay Item	Description	Unit of
No.	Measurement	
608a	Pavement Marking in non-reflective CR / TP Paint for Lines of M 12 cm width	
608b	Pavement Marking in non-reflective CR / TP Paint for Lines of M 15 cm width	
608c	Pavement Marking in non-reflective CR / TP Paint for Lines of M 20 cm width	
608d	Pavement Marking in non-reflective CR / TP Paint for 4.0 M Each arrows	

608e	Pavement Marking in non-reflective CR / TP Paint for 6.0 M arrows	Each
608f	Pavement Marking in non-reflective CR / TP Paint for various signs	SM
608g	Pavement Marking in reflective CR/TP Paint for Line of 12cm width	M
608h	Pavement Marking in reflective CR/TP Paint for Line of 15cm width	M
608i	Pavement Marking in reflective CR/TP Paint for Line of 20cm width	M
608j	Pavement Marking in reflective CR/TP Paint for 4M arrows	Each
608k	Pavement Marking in reflective CR/TP Paint for various signs	Each
608l	Pavement Marking in reflective CR/TP Paint for various signs	SM
608m	Pavement Marking by retro reflective performed pavement markings (Tape)	SM

ITEM 609 REFLECTORIZED PAVEMENT STUDS

609.1 DESCRIPTION

This item shall consist of furnishing and installing reflectorized pavement studs set into the travelled way of the type in accordance with the specifications and at the locations shown on the Drawings or as directed by the Engineer.

609.2 MATERIAL REQUIREMENTS**609.2.1 Reflectorized Studs**

Reflectorized Studs shall be "cat-eyes" either the 'Flush Surface' type or 'Raised Profile' type having the following characteristics.

a) 'Flush Surface' Type

The 'Flush Surface' reflector shall be the short base type having a maximum base area of 18 cm x 14 cm or as shown in the Drawings.

The base shall be formed in cast-iron with adequate webbing to ensure a firm key to the road when installed.

The pad shall be highly resilient and durable rubber reinforced with canvas and shall have an anticipated life of at least five (5) years. The pad shall be so designed as to produce a self whipping action of the reflector when depressed.

The reflectors shall be made of impact and abrasion resisting glass and shall be hermetically sealed into a copper socket.

(b) 'Raised Profile' Type

The 'Raised Profile' reflectors shall consist of an acrylic plastic shell filled with an adherent epoxy compound molded from methyl methacrylate into the shape of a shallow frustum of a pyramid having base dimension of approximately 10 cm x 10 cm and thickness not more than two (2) cm or as shown on the drawings.

The shell shall contain one or two prismatic reflector each inclined at an angle of thirty (30) degree to the horizontal and having an area not less than twenty (20) square cm or as indicated on the plans.

The reflectors shall attain the following standards for their photometric and physical qualities:

i) Photometric Requirements

The reflectors shall have the following minimum Specific Intensity values (S.I) expressed as candle power per foot candle of illumination at the reflector on a plane perpendicular to the incident light.

	Colour		
	Crystal	Yellow	Red
Divergence Angle (in Degree)	0.20 S.I.	0.20 S.I.	0.20 S.I.
Incidence Angle			
0	3.00	1.80	0.75
20	1.20	0.72	0.30

The reflector for testing shall be located with the center of the reflecting face at a distance of one and half (1.5) m from a uniformly bright light source having an effective diameter of half (0.5) centimeter.

The width of the photocell shall be 1.27 cms and shall be shielded from stray light. The distance from the centers of the light source and photocell shall be 0.53 cms.

Failure of more than four (4) % of the reflecting faces shall be cause for rejection of the lot.

ii) Strength Requirements

The reflectors shall support a vertical load of 1000 kg when tested in the following manner.

A reflector shall be centered horizontally over the open end of a vertically positioned hollow metal cylinder seventy five (75) mm internal diameter, twenty five (25) mm high and wall thickness of six (6) mm. The load shall be applied to the top of the reflector through a six (6) mm diameter by six (6) mm high metal plug centered on top of the reflector.

Failure shall constitute either breakage or significant deformation of the marker at any load less than one thousand (1000) kg.

609.2.2 Adhesive

When 'Raised Profile' type of reflectors are used, a two-part adhesive having the following ingredients shall be applied to the stud for bonding to the pavement surface.

Package A	Kg / Litre
Epoxy Resin	0.9400
Tianium Dioxide	0.0700
Colloidal	0.0500
Talc	0.3450
Package B	Kg / Litre
Modified Asphaltic Amine Hardener (Reinchold 2611)	0.2400
Modified Asphaltic Amine Hardener (Reinchold 2613)	0.4720
Carbon Black	0.0022
Colloidal Silica	0.0400
Talc	0.6500

Equal volumes of Package A &B should be mixed together until a uniform colour is obtained. No more than one quart of adhesive shall be prepared at one time.

609.2.3 Cement Mortar

Cement mortar shall consist of one (1) part Portland cement to three (3) parts of fine aggregates.

609.3 CONSTRUCTION REQUIREMENTS

603.3.1 Flush Surface Type

The stud shall be installed into the pavement in accordance with the manufacturer's instructions but shall also comply with the following requirements:

Cavities in the pavement shall be clearly cut to the dimension of the pavement stud and shall allow a clearance of one (1) cm around the stud base. The longitudinal center line axis of the cavity shall be the same as that required for the pavement stud when laid to correct line and direction.

The walls of the cavity shall be splayed back at an angle of approximately thirty (30) degree to the vertical to facilitate a "dove-tail" joint after the mortar has set.

The bottom of the cavity shall be leveled with asphalt concrete prior to placing the stud base, which shall be pounded into position with Pounder Foot attached to a pneumatic drill.

The depth of the cavity shall be such that when the stud base and reflectors have been installed the elevation of the floor of the lens socket shall not be greater than two (2) mm or less than one (1) mm above the pavement surface.

The stud shall be grouted into position with asphalt concrete containing fine aggregate only or with a cement mortar as described in Item 609.2.3 above when the studs are installed into a cement concrete pavement.

609.3.2 Raised Profile Type

The pavement studs shall be installed in accordance with the manufacturer's instructions or to the requirements of the Engineer.

609.4 MEASUREMENT AND PAYMENT**609.4.1 Measurement**

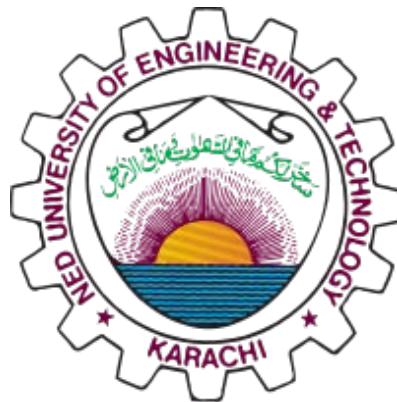
The quantity of reflectorized pavement studs to be paid for shall be the number of 'Flushed Surface' or 'Raised Profile' type provided and installed as mentioned above.

609.4.2 Payment

The quantities measured as described above shall be paid for at the contract unit price respectively for the pay items listed below and shown in the Bill of Quantities, which payment shall constitute full compensation for furnishing and placing all materials, excavating cavities, preparation of surfaces, applying adhesive and mortar, for all labour, equipment, tools and incidentals necessary to complete the item.

Pay Item	Description	Unit of
No.		Measurement
609a	Reflectorised Pavement Stud (Flush Surface Type – Single)	Each
609b	Reflectorised Pavement Stud (Flush Surface Type – Double)	Each
609c	Reflectorised Pavement Stud (Raised Surface Type – Single)	M
609d	Reflectorised Pavement Stud (Raised Surface Type – Double)	Each

NED UNIVERSITY OF ENGINEERING AND
TECHNOLOGY, KARACHI



TENDER DOCUMENT
FOR
CONSTRUCTION OF ACCESS ROAD AND
WALKWAYS TO GIRLS HOSTEL AT
NED UNIVERSITY

VOLUME – 3

BILL OF QUANTITIES
&
TENDER DRAWINGS



BILL OF QUANTITIES

CONSTRUCTION OF ACCESS ROAD & WALKWAYS TO GIRLS HOSTEL AT NED UNIVERSITY

EXECUTIVE SUMMARY

Amount in Rs.

S.N o.	Description	Cost of Schedule Items	Cost of Non-Schedule Items	Total Cost
1	Access Road and Walkways			
	Total			

CONSTRUCTION OF ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL AT NED UNIVERSITY					
<u>BILL OF QUANTITIES</u>					
SINDH SCHEDULED RATES 2024 (FOR HIGHWAYS WORKS)					
Note: (1) All the materials, tools, equipments and machinery required for completion of items including its cartage and testing shall be arranged by the Contractor at his own cost. (2) The rates are inclusive of all taxes. (3) The rates include cost of scaffolding & its removal. (4) The rates of all finished works include the removal of surplus debris, unused material and by-products.					
S.No.	Description	Quantity	Unit	Rate	Amount
1	Compaction Compaction of natural ground upto a depth of 20cm (8" inch) below the natural ground level compacted upto 90% density modified AASHTO. Chapter-1: Earthwork, Item # 2, Page # 211	56,233	P. Sft.	10.00	562,330.00
2	Cold Milling Scarifying the existing road surface by means of cold milling upto the depth of 0 - 30 mm including removal of excavated material from the site. Chapter-12: Miscellaneous, Item # 40 (a), Page # 223	25,200	P. Sft.	10.00	252,000.00
2	Kerbstone Providing and fixing Precast Edge Block 3750 PSI Industrial Made Size 6 inches thick x 12 inches long x 18 inches high including the cost of cartage, excavation, formwork for haunching, 1450 PSI lean concrete, 2250 PSI concrete for haunching, 1:4 cement sand mortar. Chapter-12: Miscellaneous, Item # 14, Page # 221	4,230	P. Rft.	678.380	2,869,547.40
3	Aggregate Base Course Providing and laying Aggregate base course in proper grade and camber having CBR 80% as per AASHTO standard specifications i/c. spreading and compacting by approved mechanical means (Motor grader, vibratory roller and smooth wheel roller etc) watering to maintain the moisture content the compaction of each layer shall 100 percent to the max dry density (Rate i/c. all cost of materials T&P and carriage upto 3 months) [202 NHA Specifications Grade A] Chapter-3: Base course, Item # 13 (b), Page # 214	28,117	P. Cft	140.00	3,936,380.00
4	Surface Treatment Providing surface dressing 1st coat on new or existing surface with 40 lbs bitumen and 5.5 cft of bajri of required size including cleaning the road surface, rolling etc, complete. (Rate includes all cost of materials T&P and carriage upto 03 chains). Using Crushed Bajri Chapter-4: Surface Treatment, Item # 15A(b), Page # 214	56,233	%Sft	5,226.70	2,939,130.21
5	3" (75mm) Asphaltic Base Course Plant Mix Providing and laying plant mix asphalt concrete binder course compacted thickness 3" (75mm) thick as per approved job mix formula using crush aggregate from approved sources. Using asphalt of grade 80/100 during laying temperature not less than 140C compacted by steel wheel and PTR roller. The procedure of laying binder course material and methodology shall fully comply with AASHTO and as directed by the Engineer-in-charge. Minimum bitumen content should be 3.5% binder course shall be spread using paver machine, rolling and finishing to design to proper grade line level and camber etc. (Machinery with POL's cost of material carriage). Chapter-5: Premixed Carpet, Item # 23 (A), Page # 217	56,233	%Sft	26,689.14	15,008,104.10

CONSTRUCTION OF ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL AT NED UNIVERSITY					
<u>BILL OF QUANTITIES</u>					
SINDH SCHEDULED RATES 2024 (FOR HIGHWAYS WORKS)					
Note:					
(1) All the materials, tools, equipments and machinery required for completion of items including its cartage and testing shall be arranged by the Contractor at his own cost.					
(2) The rates are inclusive of all taxes.					
(3) The rates include cost of scaffolding & its removal.					
(4) The rates of all finished works include the removal of surplus debris, unused material and by-products.					
S.No.	Description	Quantity	Unit	Rate	Amount
6	2" (50mm) thick Asphalt Concrete Wearing Course Plant Mix Laying to proper line and grade plant mix asphalt concrete paver finished (hydraulic / electronic control) prepared to specified formula according to job mix formula approved by Engineer-in-charge including rolling and finishing to proper line, grade level and camber etc. (Machinery with POL's cost of material carriage). Chapter-5: Premixed Carpet, Item # 24 (B), Page # 218	56,233	%Sft	19,876.84	11,177,343.44
7	Plain Cement Concrete Cement concrete plain including placing, compacting, finishing and curing, complete (including screening and washing of stone aggregate without shuttering). Chapter-4: Concrete, Item # 5, Page # 24				
f	Ratio 1:2:4	400	P.Cft.	443.54	177,416.00
h	Ratio 1:3:6	1,410	P.Cft.	388.67	548,024.70
i	Ratio 1:4:8	4,000	P.Cft.	348.83	1,395,320.00
8	Pavers a Providing and fixing cement paving blocks floorings having size of 197 x 97 x 60 (mm) of city / quadra / cobble shape with natural colours, having strength b/w 5000 PSI to 8500 PSI i/c filling the joints with hill sand and a bed of 2" thick hill sand or stone dust and laying and compacting in specified manner / pattern and design etc complete. Chapter-8: Flooring, Item # 67, Page # 50	17,766	P.Sft.	197.48	3,508,429.68
b	Providing and fixing cement paving blocks floorings having size of 197 x 97 x 60 (mm) of city / quadra / cobble shape with pigment, having strength b/w 5000 PSI to 8500 PSI i/c filling the joints with hill sand and a bed of 2" thick hill sand or stone dust and laying and compacting in specified manner / pattern and design etc complete. Chapter-8: Flooring, Item # 70, Page # 50	7,614	P.Sft.	242.26	1,844,567.64
9	Miscellaneous a Traffic Signs Providing and fixing traffic signs 3" dia G.I pipe post and sign of equilateral triangular shape each side 3'-0" long including painting, marking as directed each. Chapter-12: Miscellaneous, Item # 18 (a), Page # 222	4.0	Each	55,873.81	223,495.24
b	Thermoplastic Paint (Lane Marking) Pavement marking in reflective thermo plastic paint for lines of 6" width. Chapter-12: Miscellaneous, Item # 13, Page # 221	4,400	P. Rft	86.10	378,840.00
c	Cat-Eyes / Road Studs Supplying and fixing of reflectorised road stud double face, flushed surface type. Chapter-12: Miscellaneous, Item # 12, Page # 221	550	Each	1,520.42	836,231.00
TOTAL AMOUNT OF SCHEDULE ITEMS (CIVIL WORKS)					45,657,159.40
			Above (+) / Below (-)	=	
			COST OF SCHEDULE ITEMS	=	

CONSTRUCTION OF ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL AT NED UNIVERSITY

BILL OF QUANTITIES

NON- SCHEDULED RATES

Note:

(1) All the materials, tools, equipments and machinery required for completion of items including its cartage and testing shall be arranged by the Contractor at his own cost.
 (2) The rates are inclusive of all taxes.
 (3) The rates include cost of scaffolding & its removal.
 (4) The rates of all finished works include the removal of surplus debris, unused material and by-products.

S.No.	Description	Quantity	Unit	Rate	Amount
1	Clearing and Grubbing				
	Clearing and grubbing the site including cutting, uprooting and removal of all rubbish, shrubbs and tree roots and satisfactory disposing of all material outside the premises of NED University as directed by the engineer.	13000	%Sft.		
2	Dismantling and Disposal of Asphalt				
	Dismantling / Removal of Asphaltic wearing course and Base course from existing road including stacking, lifting, shifting and disposal at suitable place outside the University as per satisfaction of the Engineer.	56,233	P. Sft.		
3	Excavation				
	Excavation for road and walkway etc. in all kind of soil with hard stone conglomerate, morum, silt stones etc. through manually or mechanical up to any depth including lift along with disposal of excavated material within NED Premises. The cost of disposal is included.	40,000	P. Cft.		
4	Earthwork				
	Filling, watering and ramming earth in under floors or on surface with surplus earth from any place within the premises of NED University including lift and lead. Complete as per the satisfaction of the Engineer.	16,000	P. Cft.		
5	Stone Soling				
	Providing and laying of soling stone, machine compacted on a surface (subgrade) prepared earlier. The material for soling shall be angular and durable limestone rock, properly shaped or boulders of maximum size 15-20 cm. The filler material to fill the interstices shall be coarse sand or rock dust or any other material approved by the Engineer(Similar to NHA Specs Item 216). Material shall be cohesionless and clean to allow its free flow down to the bottom of soling area. As per satisfaction of Engineer In Charge.	15000	P.Cft.		

CONSTRUCTION OF ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL AT NED UNIVERSITY

BILL OF QUANTITIES

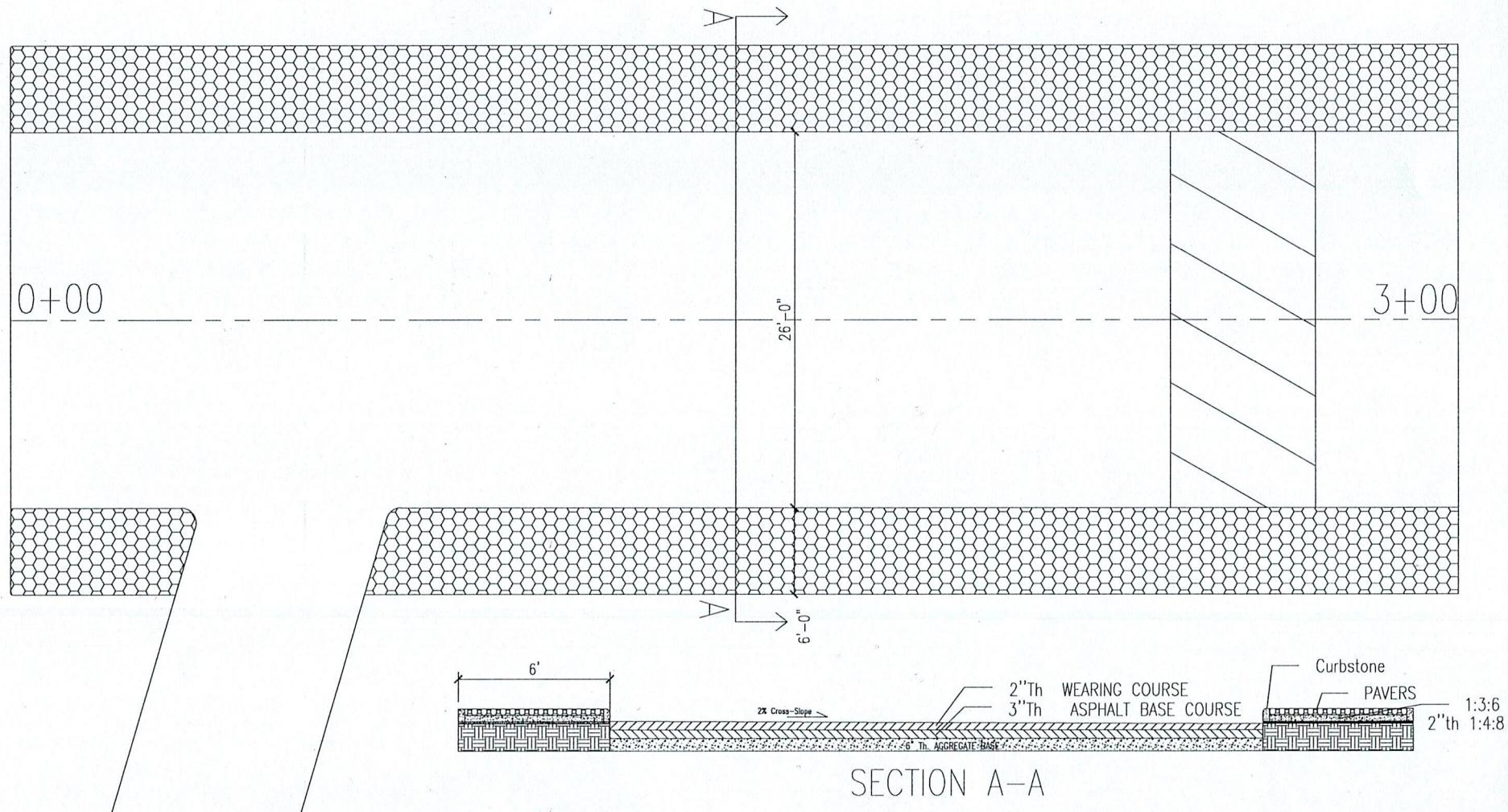
NON- SCHEDULED RATES

Note:

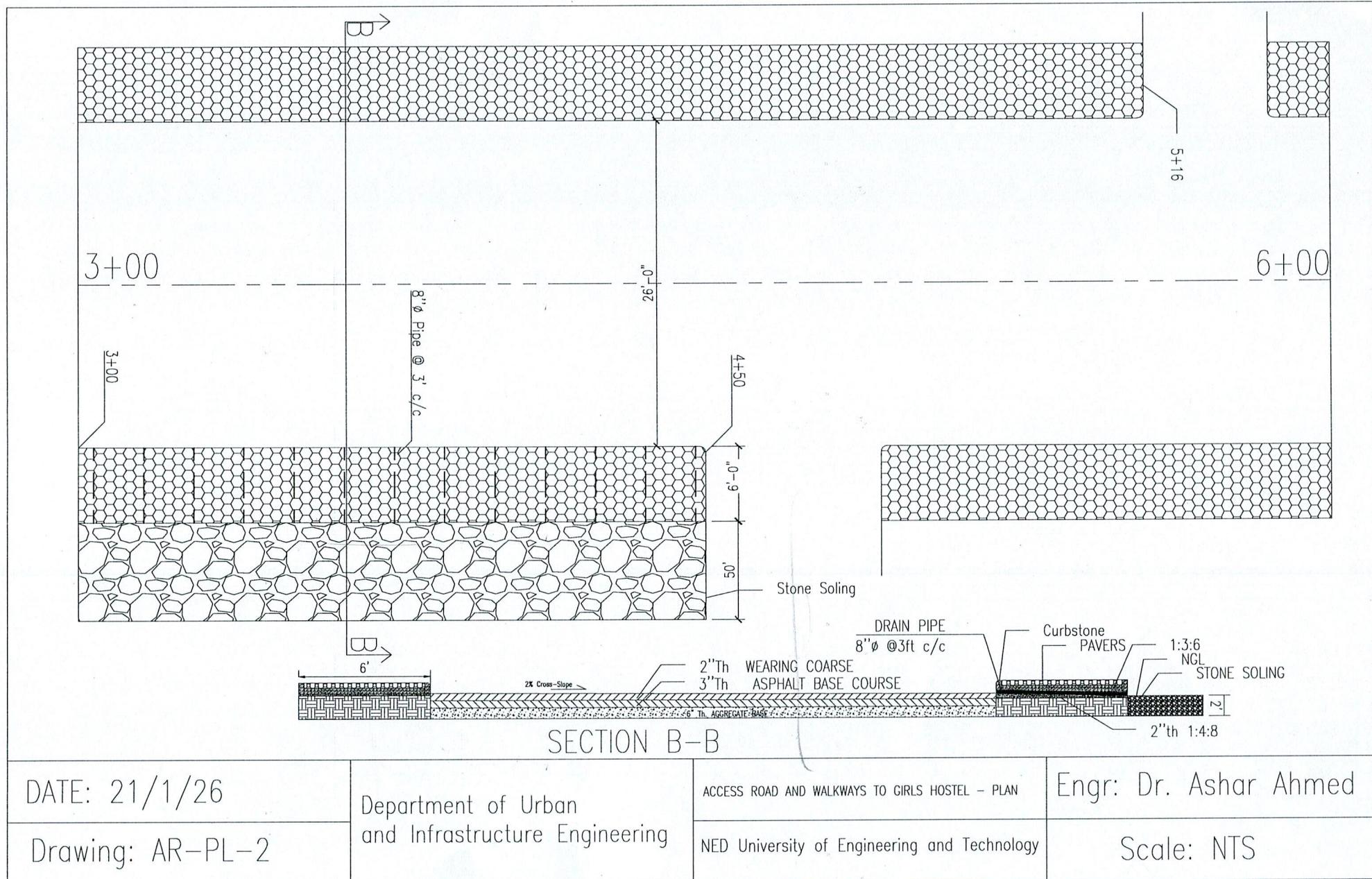
(1) All the materials, tools, equipments and machinery required for completion of items including its cartage and testing shall be arranged by the Contractor at his own cost.
 (2) The rates are inclusive of all taxes.
 (3) The rates include cost of scaffolding & its removal.
 (4) The rates of all finished works include the removal of surplus debris, unused material and by-products.

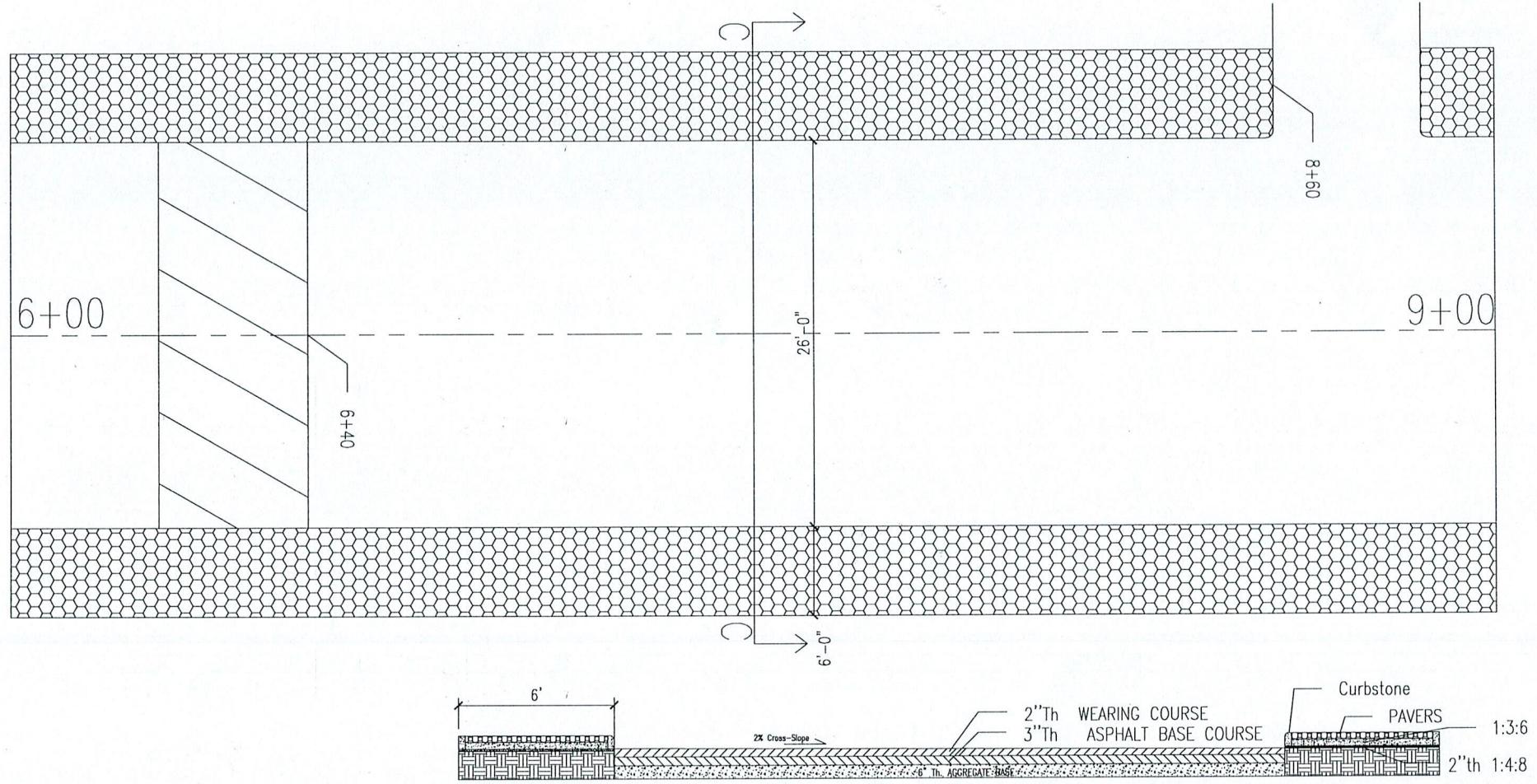
S.No.	Description	Quantity	Unit	Rate	Amount
6	ManHole Providing and Fixing Manhole Chamber of required size as per approved design and specifications including C.I Cover and frame of weight 20 kgs fixed in 4" thick RCC 1:2:4 slab, 8" thick C.C 1:3:6 block masonry walls set in 1:3 C.M 6" thick 1:3:6 C.C in foundation, 4" thick 1:4:8 C.C lean Bed, 2-1/2" thick 1:2:4 C.C in benching and haunching, 1/2" thick cement蒲lo plaster in 1:3 C.M to all inside and outer wall surface (02 kgs蒲lo bag per 50 kgs cement bag) making main and branch channels, excavation upto below required depth, backfilling, dewatering, curing, compaction and disposal of excavated surplus material etc. as per satisfaction of Engineer In Charge				
a	2'x2'x2' (inside dimensions)	4	No.		
b	4'x4'x5' (inside dimensions)	4	No.		
7	Below grade soil pipes Providing and installation of u-PVC SN-8 "Flow Line" pipes conforming to EN-4101 between manhole to manhole for soil, pipes including bend, tees, Y-tees etc as per specification and engineers approval				
	(i) 8" dia	260	Rft		
	(i) 6" dia	400	Rft		
8	Paint work on kerbstone Providing and applying oil paint on kerbstone / concrete surfaces or any other surface. Applying two coats of Matt ICI i/c. preparation of surface to be painted complete as per drawings and specifications and as per satisfaction of the Engineer.	5,280	P. Sft		
TOTAL AMOUNT OF NON-SCHEDULE ITEMS					

TENDER DRAWINGS



DATE: 21/1/26	Department of Urban and Infrastructure Engineering	ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL – PLAN	Engr: Dr. Ashar Ahmed
Drawing: AR-PL-1		NED University of Engineering and Technology	Scale: NTS





DATE: 21/1/26

Drawing: AR-PL-3

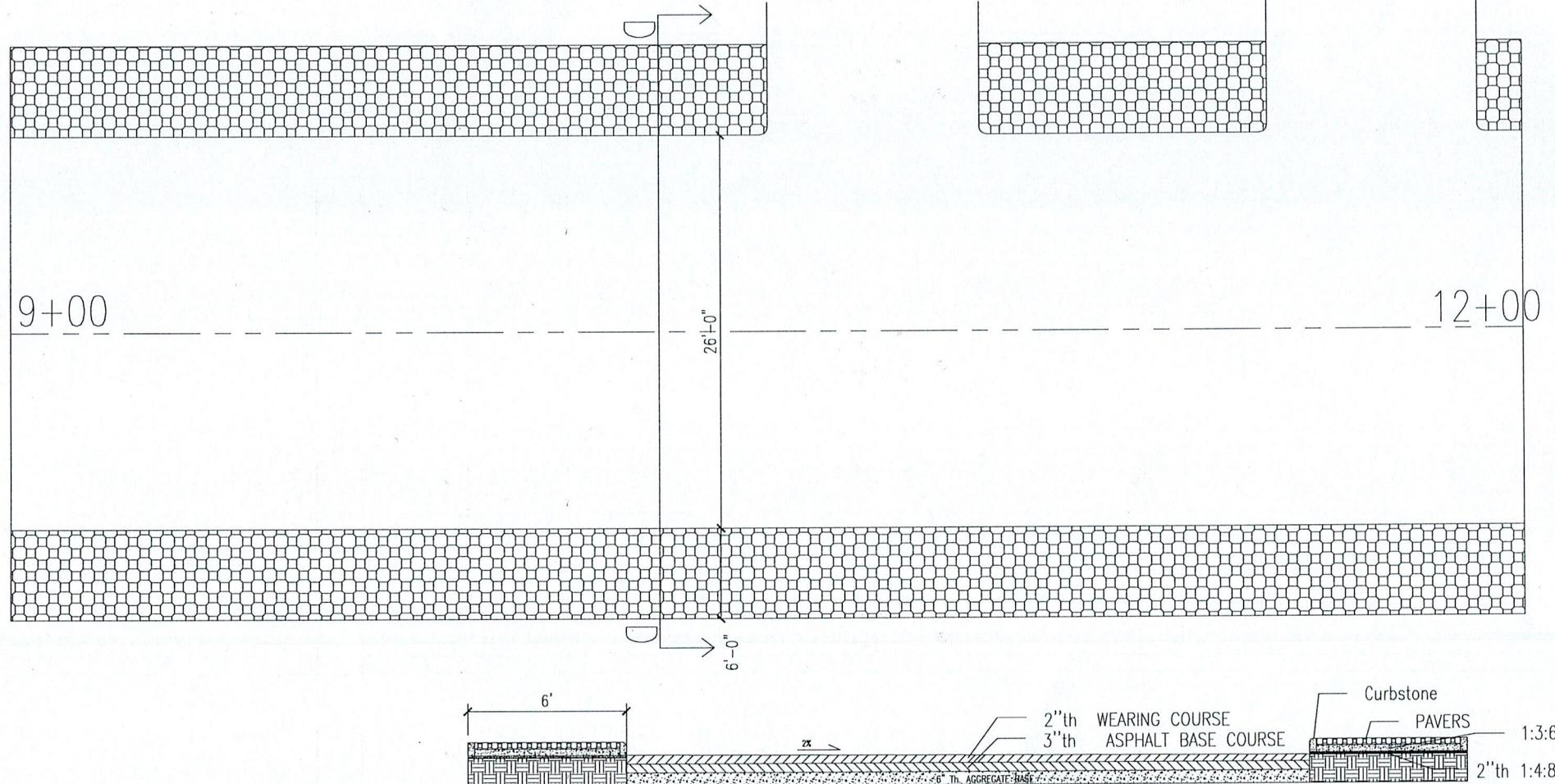
Department of Urban
and Infrastructure Engineering

ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL - PLAN

NED University of Engineering and Technology

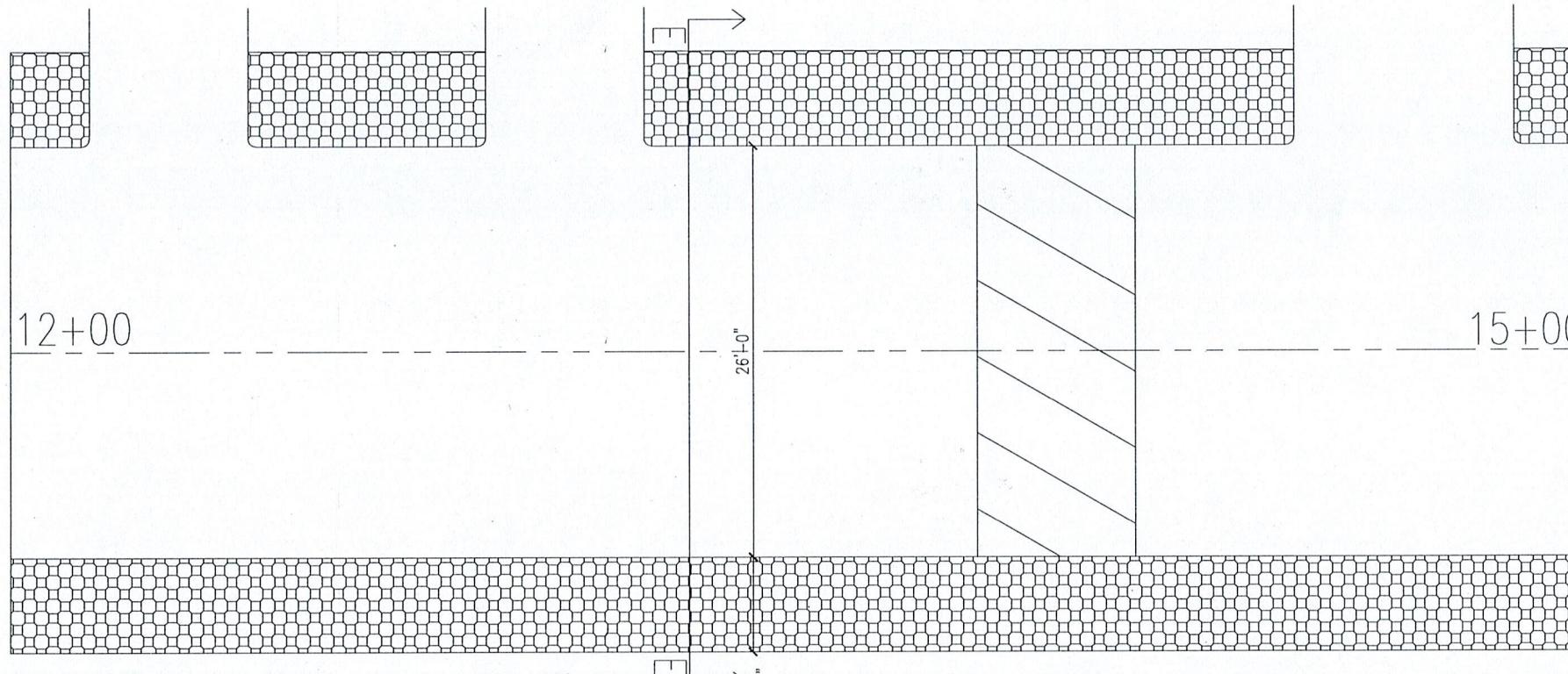
Engr: Dr. Ashar Ahmed

Scale: NTS



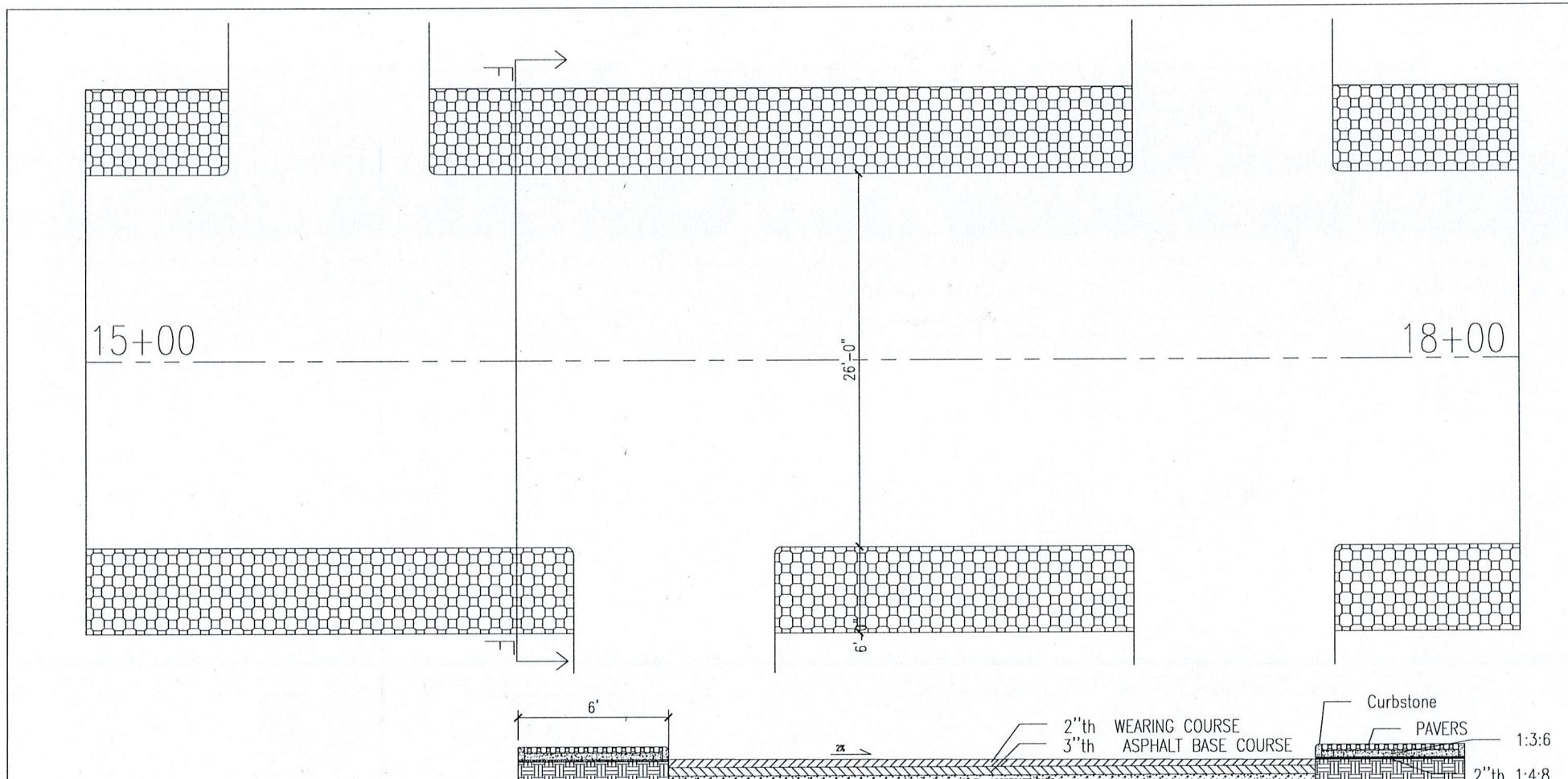
SECTION D-D

DATE: 21/1/26	Department of Urban and Infrastructure Engineering	ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL – PLAN	Engr: Dr. Ashar Ahmed
Drawing: AR-PL-4		NED University of Engineering and Technology	Scale: NTS



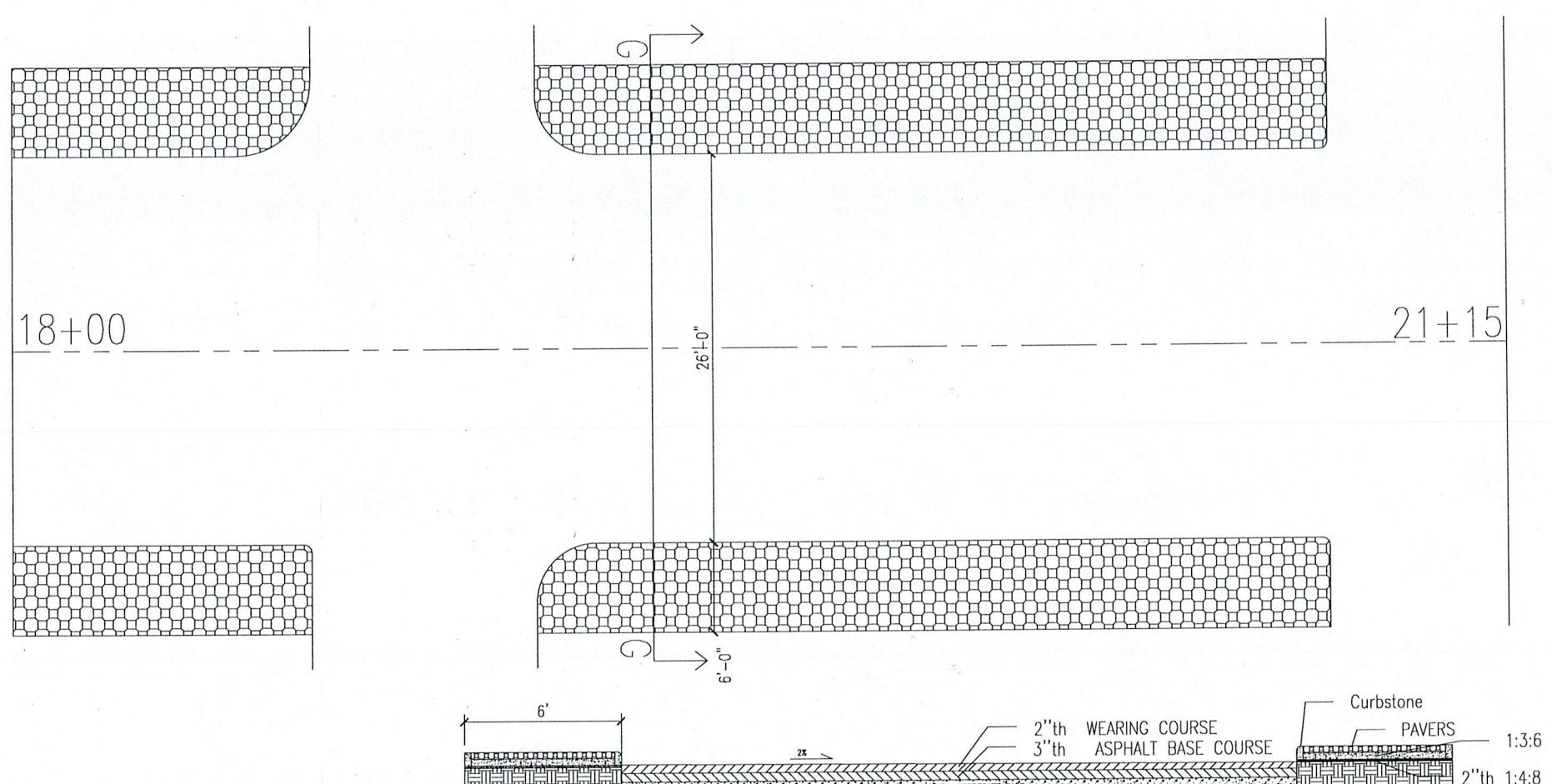
SECTION E-E

DATE: 21/1/26	Department of Urban and Infrastructure Engineering	ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL – PLAN	Engr: Dr. Ashar Ahmed
Drawing: AR-PL-5		NED University of Engineering and Technology	Scale: NTS

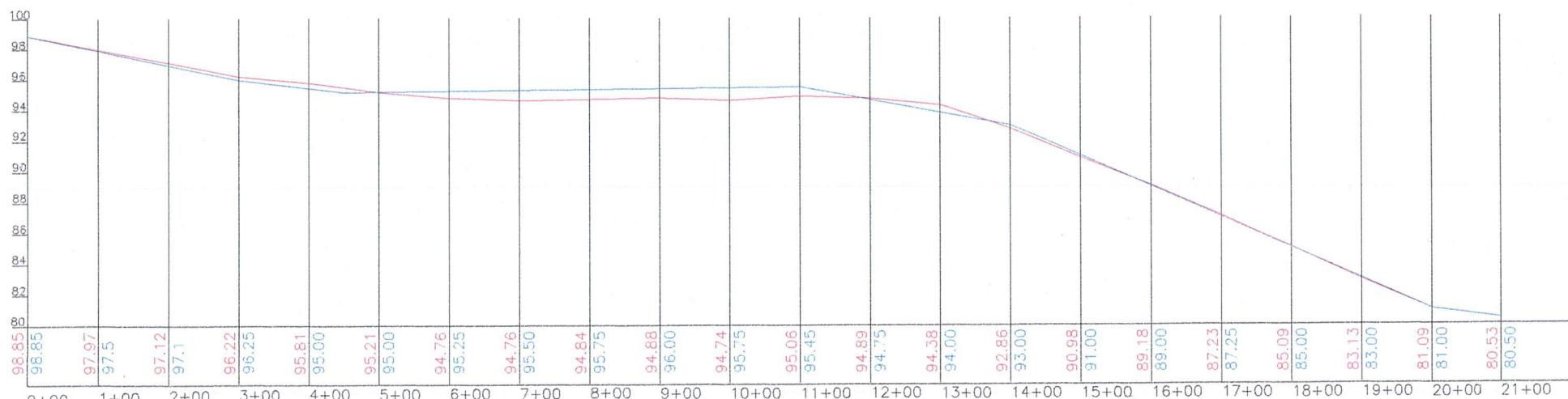


SECTION F-F

DATE: 21/1/26	Department of Urban and Infrastructure Engineering	ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL - PLAN	Engr: Dr. Ashar Ahmed
Drawing: AR-PL-6		NED University of Engineering and Technology	Scale: NTS



DATE: 21/1/26	Department of Urban and Infrastructure Engineering	ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL – PLAN	Engr: Dr. Ashar Ahmed
Drawing: AR-PL-7		NED University of Engineering and Technology	Scale: NTS



ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL PROFILE

DATE: 21/1/25

Drawing: AR-PF-1

Department of Urban
and Infrastructure Engineering

ACCESS ROAD AND WALKWAYS TO GIRLS HOSTEL - PLAN

NED University of Engineering and Technology

Engr: Dr Ashar Ahmed

Scale: NTS

NED UNIVERSITY OF ENGINEERING & TECHNOLOGY

No. DR (Estab)/(1003)/615

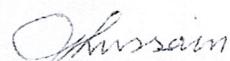
Dated: 28/01/ 2025

NOTIFICATION

In supersession of this University Officer Order No. DR(Estab)/(1003)/1990 dated: 12.02.2016, it is for information of all concerned that following the retirement of Engr. Khurshid Akhtar, former Director of Works and Services, effective from 24.01.2025, the University Administration has reconstituted the Procurement Committee for procurement of "Works" comprising of the Officers as follows:

1.	Prof. Dr. Abdul Jabbar Sangi Professor and Chairman Department of Civil Engineering	Convener
2.	Engr. Sadia Jabeen Asim Senior Civil Engineer (HEJ) University of Karachi	Member
3.	Engr. Azhar Iqbal Deputy Director Works & Services and Ag. Director Works & Services	Member / Secretary

The Terms of Reference (TORs), functions, and responsibilities of the aforementioned Committee shall be in accordance with the Rule 8 of the Sindh Public Procurement Rules 2010 (as amended). Additionally, the Committee will address all procurement matters initiated prior to the retirement of Engr. Khurshid Akhtar that are currently under evaluation.



REGISTRAR

To:
The Convener and all Members

Copy for information to:

1. Dean (ECE)
2. Director Finance
3. Director, Planning & Development
4. Director Procurement
5. Ag. Resident Auditor

NED UNIVERSITY OF ENGINEERING & TECHNOLOGY

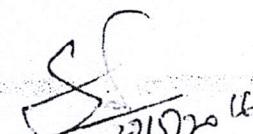
No. DR (Estab)/(1003)/5730

Dated: 27/05/2016

OFFICE ORDER

In supersession of this office order No. DR (Estab)/(1003)/11418 dated 02-11-2015, the University Administration has constituted the Complaint Redressal Standing Committee comprising of the following officers to address complaints regarding all procurement issues in the University in pursuance of Clause 31(1) of the SPPRA rules:

1.	Prof. Dr. Saad Ahmed Qazi Dean (ECE)	Convener
2.	Independent Professional from the relevant field	Member
3.	Nominee of Accountant General Sindh	Member


Ag. REGISTRAR
27/05/2016

To:

The Convener & all members

Copy for information to:

1. Dean (ECE)
2. Director Planning & Projects
3. Director Finance
4. Director, Procurement Cell
5. Ag. Resident Auditor

FOUNDED

BY QUAID-I-AZAM MOHAMMAD ALI JINNAH



DAWN

**NED UNIVERSITY
OF ENGINEERING & TECHNOLOGY**

PROCUREMENT CELL
University Road, Karachi-75270

Tel: 92361261-68, (Ext. 2411-2220) Fax # 92361255,
Email: dp@neduet.edu.pk Website: <http://www.neduet.edu.pk>

Ref: No. DP/193/021/6537/1119 Date: January 29, 2026

SAY NO TO CORRUPTION

NOTICE INVITING TENDER (EPADS)

NEDUET invites Sealed Bids on Single Stage One (Envelope procedure from Firms having Registration with Income Tax, Sales Tax and Sindh Revenue Board (whichever is applicable) to carry out following.

Construction of Access Road and Walkways to Girls Hostel at NEDUET.

Tender# PC/ NED /GH/Road /8537/2026

Issuance of Documents from	Last Date of Issuance of Tender Documents	Tenders Submission Deadline	Tenders Opening Date / Time
03.02.2026	18.02.2026	19.02.2026 10:00 AM	10:30 AM
Estimated Cost (Rs in Million):			53.524
Time of Completion			Three Months
Tender Fee (Rs):			5,000/-

ELIGIBILITY CRITERIA:

- Valid Registration with Pakistan Engineering Council in relevant category C-5 & above having specialized codes (CE-01).
- Registered with Sindh Revenue Board and FBR.
- Financial Statements (Summary) and Income Tax Return for the Last 3 years.
- List of similar assignments along with cost undertaken over past 5 years and performing certificate issuing by the procuring agency.
- Affidavit on (non-judicial stamp paper) of no litigation history, non-blacklisting, never indulge in any corrupt, fraudulent and collusive practices, also undertaking that the information and documents provided with are correct. The date of issuance of said stamp paper and bidder signature on it should be later than the publication of this NIT.
- Contractors working with NED University must submit a certificate from Project In charge that the work progress and quality of work executed are satisfactory.

TERMS AND CONDITIONS:

- Under the following conditions, Bid can be rejected:
 - Incomplete, Conditional and Telegraphic Bids.
 - Bids not accompanied by Bid Security of required amount & form.
 - Bids received after Specified Date and Time.
 - Block Listed Firms /Companies.
 - Bidders are advised that before filling the Bidding Document all papers of Bidding Documents should carefully be rechecked. If any page(s) / Paper(s) of Bidding Documents are missing, that can be downloaded from the Official website of the University and SPPRA, and also can be obtained from the Office of the DIDP in Procurement Cell, NEDUET, Karachi. Bid(s) with incomplete Bidding Document will be rejected.
- Bid Validity Period: 90 days from the date of opening of tender.
- Bid Security: Tender Fee of Rs 5,000/- and 2% of bid cost in the form of Deposit at Cash or Pay Order or Demand Draft or a Bank Guarantee issued by a scheduled bank in Pakistan or from a foreign bank duly counter guaranteed by scheduled bank in Pakistan in favor of Director Finance, NEDUET, Karachi.

Procuring Agency reserves the right to reject all or any bids subject to the relevant provisions of Sindh Public Procurement Rules 2010 (Amended up to date). Bidding documents can be obtained and shall be submitted through EPADS as per above schedule. Bidders are requested to give their Best and Final Price as "No Negotiations" is permitted. Bidding Documents containing detailed terms and conditions are available at Websites <https://www.neduet.edu.pk> and <https://www.portalsindh.eprocure.gov.pk>. In case of public holiday or any holiday or non-working day due to Force Majeure, the next official working day shall be deemed to be date for issuance, submission and opening of tenders. NEDUET shall not be responsible for any cost or expenses incurred by bidders.

Director Procurement



The logo of NED University of Engineering & Technology, featuring a circular emblem with a building and the text "NED UNIVERSITY OF ENGINEERING & TECHNOLOGY".

نوش براہی طلبی شیڈر [EPADS]

نوش براۓ ئىن ئىن
[EPADS]

Construction of Access Road and Walkways to Girls Hostel at NIEDUET.			
Tender Ref PC/ NED /GH/Road /8537/2026			
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Time of Completion	Three Months		
Tender Fee (Rs)	5,000/-		

اہلیت کے معیار:

پر کاں، اگر کوئی کام کے ساتھ حد کم کریں تو 500000 اس سے بیش میں نہیں
کوئی کام کے ساتھ حد کر سکتے، جیسا کہ:-
CE-01100
اگر کام کے ساتھ حد کم کریں تو کام کے ساتھ حد کم کریں
10 گرام تک کم کریں جو کہ اپنے کام کی میٹر میں ملے گا۔
اگر کام کے ساتھ حد کم کریں تو کام کی میٹر میں کام کی میٹر سے کم کریں
200 قریب 200 اس کے پہلے سے بیش تر کر دیں کہاں کی میٹر میں کام کی میٹر سے کم کریں۔
اگر کام کے ساتھ حد کم کریں تو کام کی میٹر میں کام کی میٹر سے کم کریں
کیا گیا ہے اس کے پہلے سے بیش تر کر دیں کہاں کی میٹر میں کام کی میٹر سے کم کریں
کام کے ساتھ حد کم کریں کہاں کی میٹر میں کام کی میٹر سے کم کریں۔
کام کے ساتھ حد کم کریں کہاں کی میٹر میں کام کی میٹر سے کم کریں۔

شروع و پیواید

لارڈ اری کو نہ لارڈ ارڈنر پہلے کہا گیا تھا کہ مارٹن 2010ء (اصل لارڈ ارڈنر) کی
حکومت کے تحت کمیٹی میں گھس کر کے اپنے کام کیا ہے۔

پر دعویٰ ہے (https://www.portalsindh.aprocurer.gov.pk) سرکاری مکمل ہوئی ہے اور سمجھ کر دوستی کام کے دن کی صورت میں اکتوبر سرکاری کام کوں چڑھ کے کام انجام کر دے کر کچے کی وجہ تصریح کر دے گا۔

ڈاکٹر کمشنر پریس کمیٹی

