Daily The News

Dated: 12-01-2024

KARACHI PORT TRUST
GATEWAY TO PAKISTAN
A GNAT HERITAGE — A VIBRANT FUTURE

TENDER NOTICE - Engineering Department

Chief Engineer KPT invited Tenders, under PPRA Rule 36 (a) from Bidders registered with Government, Semi Government Department / Organizations or with any reputable client for the following work. All interested Firms who possess experience in the relevant field may obtain the tender documents available on the downloaded version at KPT, PPRA & MOMA Websites.

NAME & SCOPE OF WORK	DATE & TIME OF RECEIPT AND OPENING OF TENDER
MAINTENANCE / REPAIR & ROAD PATCH WORK AT VARIOUS LOCATIONS AND LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA The work mainly comprises of: • Removal of Existing Patch of Roads for Laying Drainage Pipe Line. • Laying of 8" dia UPVC Pipe for drainage including Provision of Manholes. • Repairing of Road with 2" Thick Asphalt Concrete. • Provision of Kerb Stone Lane Marking etc. • Repairing of Existing Damaged M.S Barrier including Provision of 06 Nos. New M.S Barrier at the newly proposed Locations. • Dismantling / Chiseling Cement Concrete. • UPVC Pipe Works. • Providing / Laying 1:2:4 C.C. • Other allied works. **(Bid Security amount Rs. 800,000 fixed (Refundable) in form of Pay Order in the favor of Chief Accounts Officer KPT)**	13-02-2024 Receipt at 11:00 HRS. & Opening at 11:30 HRS. Tender Fee Rs. 5,000/- (Non Refundable)

1. The intending Bidders must be registered with the Pakistan Engineering Council in Category C-5 and Specialized Category CE-09 & CE-10 above valid on the date of opening of Tender.
2. The Intending Bidders may visit KPT / PPRA & MOMA Websites and may Download the Tender Documents. The Prescribed Tender Fees amounting to Rs. 5,000/- (non-refundable) and the Bid Security of the work which is Rs. 800,000/- fixed (Refundable) will be submitted separately envelope along with the Bid at the time of submission of tender in Shape of Pay Orders, in favor of Chief Account Officer, KPT.

The Mandatory requirement to be fulfill as mentioned from (a to h).

a) Copy of Valid PEC Registration Certificates.
b) Copy of latest Valid NTN, SRB Certificates.
c) Copy of Online Tax verification (fresh copy of ATL).
d) Updated Company Profile for those participating first time in KPT.
e) Copy of Valid PEC Registration Certificate.
f) Affidavit, that the firm is not defaulter in Income tax department nor blacklisted by any Organization.
g) a. In case of companies and firms, last three years Audited Financial Statements are to be provided showing minimum average turnover of Rs. 15 (M). (As also specific in the Bidding Documents).
b. In case of individuals / sole proprietors, last three years tax returns filed with FBR are to be provided showing minimum turnover of Rs. 15 (M) on average for three years.
h) Relevant work Experience as laid down in Bidding Documents.
i) All Submission will be duly Signed & Stamped by the bidder.

3. Only the FBR & SRB Registered Bidders are eligible for bidding, Bidder has to quote their rates inclusive of all Govt. Taxes as applicable as per Standard Format.
4. The Bid opening will take place in the Committee Room of the Civil Works / Engineering Department, at 2nd Floor, KPT Head Office Building, Karachi on given date & time.
5. The KPT may reject all bids or proposals at any time prior to the acceptance of a Bid or Proposal. The KPT shall upon request communicate to any supplier or contractor who submitted a Bid or Proposal, the grounds for its rejection of all Bids or Proposals, but is not required to justify those grounds.
6. The Bidder must read the instructions contained in Para 1-6 carefully especially the Para-2 in its true letter & Sprit.
7. Intended Bidders are requested to attend the Pre-Bid Meeting 25-01-2024 at 1130 Hrs. in Committee Room of Chief Engineer, 2nd Floor, Engineering Department, KPT, Head Office, along with the queries in written the reply of same would be posted at Websites of PPRA/KPT within 02 days of receipt of the queries.

CHIEF ENGINEER
KPT Head Office Building,
Edulljee Dinshaw Road, Karachi-74000,
UAN 111-KPT-111, Ph: 99214318 Fax: 99214329-30.
Website: www.kpt.gov.pk, PPRA website address: www.ppra.org.pk

PID (K) No. 2001/2023

DOCUMENTS TO BE RETURNED

KARACHI PORT TRUST

GATEWAY TO PAKISTAN

CIVIL WORKS DIVISION

BIDDING DOCUMENT

FOR

MAINTENANCE / REPAIR AND ROAD PATCH WORK AT VARIOUS LOCATIONS & LAYING OF STROM WATER DRAIN LINE AT LALAZAR AREA

SINGLE-STAGE – SINGLE ENVELOPE PROCEDURE

January 2024

CHIEF ENGINEER
K.P.T

SUMMARY OF CONTENTS

CHIEF ENGINEER
K.P.T

KARACHI PORT TRUST

GATEWAY TO PAKISTAN

CIVIL WORKS DIVISION

INVITATION FOR BIDS

Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Strom Water Drain Line At Lalazar Area

Bid Reference No.:

Daily The News

Dated: 12-01-2024

KARACHI PORT TRUST
GATEWAY TO PAKISTAN
A GNAT HERITAGE — A VIBRANT FUTURE

TENDER NOTICE - Engineering Department

Chief Engineer KPT invited Tenders, under PPRA Rule 36 (a) from Bidders registered with Government, Semi Government Department / Organizations or with any reputable client for the following work. All interested Firms who possess experience in the relevant field may obtain the tender documents available on the downloaded version at KPT, PPRA & MOMA Websites.

NAME & SCOPE OF WORK	DATE & TIME OF RECEIPT AND OPENING OF TENDER
MAINTENANCE / REPAIR & ROAD PATCH WORK AT VARIOUS LOCATIONS AND LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA The work mainly comprises of: • Removal of Existing Patch of Roads for Laying Drainage Pipe Line. • Laying of 8" dia UPVC Pipe for drainage including Provision of Manholes. • Repairing of Road with 2" Thick Asphalt Concrete. • Provision of Kerb Stone Lane Marking etc. • Repairing of Existing Damaged M.S Barrier including Provision of 06 Nos. New M.S Barrier at the newly proposed Locations. • Dismantling / Chiseling Cement Concrete. • UPVC Pipe Works. • Providing / Laying 1:2:4 C.C. • Other allied works. **(Bid Security amount Rs. 800,000 fixed (Refundable) in form of Pay Order in the favor of Chief Accounts Officer KPT)**	13-02-2024 Receipt at 11:00 HRS. & Opening at 11:30 HRS. Tender Fee Rs. 5,000/- (Non Refundable)

1. The Intending Bidders must be registered with the Pakistan Engineering Council in Category C-5 and Specialized Category CE-09 & CE-10 above valid on the date of opening of Tender.
2. The Intending Bidders may visit KPT / PPRA & MOMA Websites and may Download the Tender Documents. The Prescribed Tender Fees amounting to Rs. 5,000/- (non-refundable) and the Bid Security of the work which is Rs. 800,000/- fixed (Refundable) will be submitted separately envelope along with the Bid at the time of submission of tender in Shape of Pay Orders, in favor of Chief Account Officer, KPT.

<u>The Mandatory requirement to be fulfill as mentioned from (a to h).</u>

a) Copy of Valid PEC Registration Certificates.
b) Copy of latest Valid NTN, SRB Certificates.
c) Copy of Online Tax verification (fresh copy of ATL).
d) Updated Company Profile for those participating first time in KPT.
e) Copy of Valid PEC Registration Certificate.
f) Affidavit, that the firm is not defaulter in Income tax department nor blacklisted by any Organization.
g) a. In case of companies and firms, last three years Audited Financial Statements are to be provided showing minimum average turnover of Rs. 15 (M). (As also specific in the Bidding Documents).
b. In case of individuals / sole proprietors, last three years tax returns filed with FBR are to be provided showing minimum turnover of Rs. 15 (M) on average for three years.
h) Relevant work Experience as laid down in Bidding Documents.
i) All Submission will be duly Signed & Stamped by the bidder.

3. Only the FBR & SRB Registered Bidders are eligible for bidding, Bidder has to quote their rates inclusive of all Govt. Taxes as applicable as per Standard Format.
4. The Bid opening will take place in the Committee Room of the Civil Works / Engineering Department, at 2nd Floor, KPT Head Office Building, Karachi on given date & time.
5. The KPT may reject all bids or proposals at any time prior to the acceptance of a Bid or Proposal. The KPT shall upon request communicate to any supplier or contractor who submitted a Bid or Proposal, the grounds for its rejection of all Bids or Proposals, but is not required to justify those grounds.
6. The Bidder must read the instructions contained in Para 1-6 carefully especially the Para-2 in its true letter & Sprit.
7. Intended Bidders are requested to attend the Pre-Bid Meeting 25-01-2024 at 1130 Hrs. In Committee Room of Chief Engineer, 2nd Floor, Engineering Department, KPT, Head Office, along with the queries in written the reply of same would be posted at Websites of PPRA/KPT within 02 days of receipt of the queries.

CHIEF ENGINEER
KPT Head Office Building,
Eduljee Dinshaw Road, Karachi-74000,
UAN 111-KPT-111, Ph: 99214318 Fax: 99214329-30.
Website: www.kpt.gov.pk. PPRA website address: www.ppra.org.pk

PID (K) No. 2001/2023

Daily Express

Dated: 12-01-2024

کراچی پورٹ ٹرسٹ

ٹینڈر نوٹس-انجینئرنگ ڈپارٹمنٹ

کام کا نام اور اسکوپ	ٹینڈر کی وصولی اور کھلنے کی تاریخ اور وقت
مختلف مقامات پر مینٹیننس / مرمت اور روڈ پیچ ورک اور لالہ زار ایریا میں اسٹورم واٹر ڈرین لائن کی بچھائی کا کام • Chiseling / انہدام سیمنٹ کنکریٹ • یو پی وی سی پائپ ورکس • 1:2:4 سی سی کی فراہمی / بچھائی • دیگر متعلقہ کام	13.02.2024 وصولی بوقت دن 11:00 بجے اور کھلنا بوقت دن 11:30 بجے ٹینڈر فیس 5,000/- روپے (ناقابل واپسی)

چیف انجینئر
کے پی ٹی ہیڈ آفس بلڈنگ، ایڈلجی ڈنشا روڈ کراچی۔74000
یو اے این: 111-KPT-111، فون: 99214318، فیکس: 99214329-30
ویب سائٹ: www.kpt.gov.pk
پی پی آر اے ویب سائٹ: www.ppra.org.pk

PID(K)2001/2023

CHIEF ENGINEER
K.P.T

Bidding Data

Instructions to Bidders

Clause Reference

<table>
<tr><td>IB.1.1</td><td>Name and address of the Employer: The Employer is KARACHI PORT TRUST</td></tr>
<tr><td>IB.1.1</td><td>Name of the Project & Summary of the Works:

This Contract envisages for the <u>Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Strom Water Drain Line At Lalazar Area</u>

<table>
<tr><td>Removal Of Existing Patch Of Road For Laying Drainage Pipe Line.</td><td>Dismantling /chiseling cement concrete.</td></tr>
<tr><td>Laying of 8” Dia UPVC pipes for drainage including Provision of Manholes</td><td></td></tr>
<tr><td>Repairing of road with 2” Thick Asphalt Concrete.</td><td>Providing / Laying 1:2:4 C.C</td></tr>
<tr><td>Provision of kerb Stone Lane Marking etc.</td><td>Other allied works</td></tr>
<tr><td>Repairing of existing Damaged M.S Barrier including Provision of 06 Nos. New M.S Barrier at the newly proposed Location.</td><td></td></tr>
</table></td></tr>
<tr><td>IB.2.1</td><td>Name of the Borrower/Source of Financing/Funding Agency:

The employer is funding this project through its own resources.</td></tr>
<tr><td>IB.3.1 (a)</td><td>Eligible Bidders

The intending Bidders must be registered with the Pakistan Engineering Council in Category C-5 and above with specialized code CE-09 & CE-10, valid on the date of opening of Tender.</td></tr>
<tr><td>IB.7</td><td>The Bidding documents are those stated below and should be read in conjunction with any addenda issued in accordance with clause IB.9.

Volume: I
▪ Instructions to Bidders.
▪ Bidding Data.
▪ Form of Bid and Appendices including BOQ.
▪ Forms
▪ Conditions of Contract

Volume: II
▪ Specifications – Special & Technical Provisions

Volume: III
▪ Bill of Quantities (BOQ)

Volume: IV
• Tender Drawings</td></tr>
<tr><td>IB.8.1</td><td>Time limit for clarification:

The limit for clarification is 10 days before opening of tenders</td></tr>
<tr><td>IB.10.1</td><td>Bid language:

The Bid language is “ENGLISH”.</td></tr>
</table>

CHIEF ENGINEER
K.P.T

IB.13.1	**Bidders to quote entirely in Pak. rupees**
IB.14.1	**Period of Bid Validity:** The period of Bid validity is 180 days.
IB.15.1	**Amount of Bid Security**: This clause may be read as:- The amount of Bid Security is Rs. 800,000.00 (Rupees: Eight Hundred Thousand only) in the form of Pay Order only in the name of Chief Accounts Officer KPT.
IB 16	**Alternate Proposals by Bidders** This clause is deleted in its entirety.
IB 17.1	**Venue, time, and date of the Pre-Bid meeting:** Venue: Committee Room of Engineering Deptt. 2nd floor. KPT Head Off. Bldg. Eduilji Dinshaw Road. Karachi. Time: 11.30 Date: 25-01-2024
IB.18.4	**FORMAT & Signing of BID** Number of copies of the Bid to be completed and returned, duly signed and Stamped on Each and Every Page. One Original / One Copy & USB.
IB.19.2(a)	**Employer's address for the purpose of Bid submission:** Chief Engineer, Engineering Department Karachi Port Trust KPT Head Office Building Eduljee Dinshaw Road Karachi-74000 Pakistan.
IB.20.1(a)	**Deadline for submission of bids:** As notified in "Invitation to Bids".
IB.23.1	**Venue, time, and date of Bid opening:** As notified in "Invitation to Bids".
IB.23.3	In the third line of this sub-clause add the words "the amount of Bid Security " after the words "or absence of Bid Security."
IB.28.1	In the first line of this sub-clause add the word " Consultant " after the word " Employer"
IB.29.2	In the first line of this sub-clause add the word " / Consultant " after the word " Employer" and in the third line replace the word " contractors" by "Bidders"
IB.31.4	In the first line of this sub-clause add the word " acceptable " before the word " Performance Security"
IB.32.1	**Standard form and amount of Performance Security acceptable to the Employer:** The amount of Performance Security would be 10% of the Contract Value. The Performance Security would be acceptable to the Employer in the shape of un-conditional **BANK GUARANTEE ONLY**. In the first line of this sub-clause add the word "an acceptable " before the word " Performance Security" and also delete the word "a" before the word " Performance Security".
IB.33.2	In the second line of this sub-clause add the word " duly completed " before the word " contract agreement"

DELETED

CHIEF ENGINEER
K.P.T

INSTRUCTIONS TO BIDDERS
&
BIDDING DATA

TABLE OF CONTENTS
INSTRUCTIONS TO BIDDERS

CHIEF ENGINEER
K.P.T

INSTRUCTIONS TO BIDDERS

A. GENERAL

IB.1 Scope of Bid & Source of Funds

1.1 Scope of Bid

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

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

1.2 Source of Funds

The Employer has arranged funds from its own sources.

IB.2 Eligible Bidders

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

a) Bidders must possess the valid PEC License in Category C-05 or above, with specialized category of CE-09, CE-10

b) Duly registered in the tax authorities (FBR & SRB) and possess NTN Number.

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.

IB.4 One Bid per Bidder

4.1 Each bidder shall submit only one bid either by himself. A bidder who participates in more than one bid (other than alternatives pursuant to Clause IB.16) will be disqualified.

IB.5 Site Visit

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

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

CHIEF ENGINEER
K.P.T

B. BIDDING DOCUMENTS

IB.6 Contents of Bidding Documents

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.8.1.

1. Instructions to Bidders & Bidding Data
2. Forms of Bid (for Technical & Price bid) & Schedules to Bid
   Schedules to Bid comprise the following:
   - Schedule A to Bid: Schedule of Prices
   - Schedule B to Bid: Specific Works Data – Special Instructions
   - Schedule C to Bid: Proposed Programme of Works
   - Schedule D to Bid: Method of Performing Works
   - Schedule E to Bid: Integrity Pact
3. Conditions of Contract & Contract Data
4. Standard Forms:
   (i) Bid Security
   (ii) Performance Security
   (iii)Form of Contract Agreement
5. Specifications / special instructions
6. Drawings, if any

6.2 The bidders are expected to examine carefully the contents of all the above documents. Failure to comply with the requirements of bid submission will be at the Bidder's own risk. Pursuant to Clause IB.25, bids that are not substantially responsive to the requirements of the Bidding Documents will be rejected.

IB.7 Clarification of Bidding Documents

7.1 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.

7.2 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 deadline for submission of Bids, who have received the Bidding Documents including a description of the enquiry/queries but without identifying its source.

IB.8 Amendment of Bidding Documents

8.1 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 with the approval of the Chief Engineer.

8.2 Any addendum thus issued shall be part of the Bidding Documents pursuant to Sub-Clause 8.1 hereof, and shall be communicated in writing to all Employer of the Bidding Documents. Prospective bidders shall acknowledge receipt of each addendum in writing to the Employer.

8.3 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.9 Language of Bid

9.1 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.

IB.10 Documents Comprising the Bid

10.1.1 The Bid shall comprise One envelope submitted containing the financial and the Technical bid along with the original Bid Security and the Priced Bid, containing the documents listed. The envelope to be enclosed together in an outer single envelope called the Bid. Each bidder shall furnish all the documents as specified 10

CHIEF ENGINEER
K.P.T

IB.11 Sufficiency of Bid

11.1 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.

11.2 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 the execution and supply of water at various locations

IB.12 Bid Prices, Currency of Bid and Payment

12.1 The bidder shall fill up the Schedule of Prices (Schedule A to Bid) indicating the unit rates and prices of the Works under the Contract. Schedule A to Bid shall only be provided in Price Bid.

12.2 The price adjustment on account of change in prices and labour wages shall be admissible as per special instructions given in Schedule B to Bid.

12.3 The unit rates and prices in the Schedule of Prices shall be quoted by the bidder in the Pakistani Rupees only .

IB 13 Documents Establishing Bidders' Eligibility and Qualification

13.1 Pursuant to Clause IB.10, 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.

13.2 Bidder 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.

The documentary evidence of the Works' conformity to the Bidding Documents should be in the form of Schedule F to bid and the bidder shall furnish the required documents as set out in the Schedule F of the Bid

IB.14 Documents Establishing Works' Conformity to Bidding Documents

14.1 To establish the conformity of the Works to the Bidding Document, **the Bidder shall furnish as part of its Bid the documentary evidence of the same as per Tender Notice.**.

IB.15 Bid Security

15.1 Each bidder shall furnish, as part of his bid, at the option of the bidder, a Bid Security for an amount of Rs. 800,000/- (Fixed) in Pak. Rupees in the form of Pay order or a Bank Guarantee issued by a Scheduled Bank in Pakistan having at least AA rating from PACRA/JCR in favor of the Chief Accounts Officer, KPT valid for a period up to Twenty Eight (28) days beyond the bid validity date.

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

15.3 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.

15.4 The Bid Security of the successful bidder will be returned when the bidder has furnished the required Performance Security, pursuant to Clause IB.32 and signed the Contract Agreement, pursuant to Sub-Clauses IB.33.1 & 33.2.

15.5 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 25.2 (b) hereof; or
(c) if a bidder submit the false/ forged/ tempered documents in conformity of his eligibility
(c) in the case of a successful bidder, if he fails to:
(i) furnish the required Performance Security in accordance with Clause IB.32, or
(ii) sign the Contract Agreement, in accordance with Sub-Clauses IB. 33.1 & 33.2

CHIEF ENGINEER
K.P.T

IB.16 Validity of Bids

16.1 Bids shall remain valid for the period stipulated in the Bidding Data after the date of bid opening. In exceptional circumstances, prior to the expiry of the original bid validity period, the Employer may request that the Bidders to extend the period of validity for a specified additional period which shall in no case be more than the original bid validity period. The request and the responses thereto shall be made in writing. A Bidder may refuse the request without forfeiting his Bid Security. A Bidder agreeing to the request will not be required or permitted to modify his bid, but will be required to extend the validity of his Bid Security for the period of the extension, and in compliance with Clause IB.15 in all respects.

IB.17 Pre-Bid Meeting

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

17.2 The bidders are requested to submit questions, if any, in writing so as to reach the Employer **Two Days** before the proposed pre-bid meeting.

17.3 Minutes of the pre-bid meeting, including the text of the questions raised and the replies given, will be transmitted without delay to all purchasers of the Bidding Documents. Any modification of the Bidding Documents listed in IB 6 hereof, which may become necessary as a result of the pre-bid meeting shall be made by the Employer exclusively through the issue of an Addendum pursuant to Clause IB.8 and not through the minutes of the pre-bid meeting.

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

D. SUBMISSION OF BIDS FOR SINGLE STAGE SINGLE ENVELOPE BIDDING PROCEDURE

IB.18 Format and Signing of Bid

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

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

18.3 No alteration is to be made in the Letters of Price and Technical Bids nor in the Appendices thereto except in filling up the blanks as directed. If any such alterations be made or if these instructions be not fully complied with, the bid may be rejected.

18.4 The Bidder shall prepare one original of the Technical Bid and one original of the Price Bid comprising the Bid as described in Bidding Data Sheet against IB 10 and clearly mark it "ORIGINAL - TECHNICAL BID" and "ORIGINAL - PRICE BID". In addition, the Bidder shall submit a Copies of the Bid and clearly mark each of them "COPY." In the event of any discrepancy between the original and the copies, the original shall prevail.

18.5 The original and all copies of the Bid shall be typed or written in indelible ink and shall be signed by a person duly authorized to sign on behalf of the Bidder. This authorization shall consist of a written confirmation as specified in the Bidding Data Sheet and shall be attached to the bid. The name and position held by each person signing the authorization must be typed or printed below the signature. All pages of the Bid, except for un-amended printed literature, shall be signed or initialed by the person signing the bid.

CHIEF ENGINEER
K.P.T

18.6 Any amendments such as interlineations, erasures, or overwriting shall be valid only if they are signed/ initialed & stamped by the person signing the bid.

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

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

IB.19 Sealing and Marking of Bids

19.1 Each bidder shall submit his bid as under:

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

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

(c) The technical bid should comprise of documents listed in IB10.1 (A) & the price bid should comprise of documents listed in IB 10.1 (B) which shall be placed in separate envelopes in accordance with IB 10.1.

19.2 The inner and outer envelopes shall:

(a) Be addressed to the Employer at the address as under:

CHIEF ENGINEER,
Civil Works Division
Karachi Port Trust (KPT),
Eduljee Dinshaw Road, Karachi-74000.
Tel No. + 92 21 9921 4318
Fax No. + 92 21 9921 4329 – 30

(b) Bear the name and identification number of the contract as under:

CHIEF ENGINEER
K.P.T

(c) **Provide a warning not to open before the time and date for bid opening:**

19.3 In addition to the identification required in IB 19.2 hereinabove, the inner envelope shall indicate the name and address of the bidder to enable the bid to be returned unopened in case it is declared "late" pursuant to Clause IB.22

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

IB.20 Deadline for Submission of Bids

20.1 (a) Bids must be received by the Employer at the address specified no later than :

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

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

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

20.2 The Employer may, at his discretion, extend the deadline for submission of Bids by issuing an amendment in accordance with Clause IB.8, in which case all rights and obligations of the Employer and the bidders previously subject to the original deadline will thereafter be subject to the deadline as extended.

IB.21 Late Bids

21.1 (a) Any bid received by the Employer after the deadline for submission of bids prescribed in Clause IB.24 will be returned unopened to such bidder.

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

E BID OPENING AND EVALUATION FOR SINGLE STAGE TWO ENVELOPE BIDDING PROCEDURE

IB. 22 Bid Opening

22.1 The Employer will open the Technical Bids in public at the address, date and time

in the presence of Bidders` designated representatives and anyone who choose to attend.

The Price Bids will remain unopened and will be held in the custody of the Employer until the specified time of their opening. All bidders must note that "WITHDRAWAL", SUBSTITUTION" and "MODIFICATION" of bids is NOT ALLOWED

DELETED

22.2 **DELETED**

CHIEF ENGINEER
K.P.T

22.3 **DELETED**

22.4 **DELETED**

22.5 The Technical Bids shall be opened one at a time and the following read out and recorded:

(a) The name of the Bidder;
(b) The presence of a Bid Security, and
(c) Any other details as the Employer may consider appropriate.

No Bid shall be rejected at the opening of Technical Bids except for late bids, in accordance with IB 21. Only Technical Bids read out and recorded at bid opening, shall be considered for evaluation.

Preliminary Examination of Technical Bids

22.6 a) The Employer shall first examine qualification and experience as per bidding requirements submitted by the Bidder. The technical proposal examination of those bidders only shall be taken in hand who meet the minimum requirement as mentioned in bidding requirement. Only substantially responsive qualification shall be considered for further evaluation.

b) The Employer shall examine the Technical Bid to confirm that all the documents have been provided, and to determine the completeness of each document submitted.

22.7 The Employer shall confirm that all the documents and information have been provided for evaluation of Technical bid as required under these bidding documents.

22.8 At the end of the evaluation of the Technical Bids, the Employer will invite only those bidders who have submitted substantially responsive Technical Bids and who have been determined as being qualified for award to attend the opening of the Price Bids.

The date, time, and location of the opening of Price Bids will be advised in writing by the Employer. Bidders shall be given reasonable notice for the opening of Price Bids.

22.9 The Employer will notify Bidders in writing who have been rejected on the grounds of their Technical Bids being substantially non-responsive to the requirements of the Bidding Document and return their Price Bids unopened before inviting others, who are determined as being qualified, to attend the opening of Price Bids.

22.10 The Employer shall conduct the opening of Price Bids of all Bidders who submitted substantially responsive Technical Bids publically in the presence of Bidders` representatives who choose to attend at the address, date and time specified by the Employer. The Bidder's representatives who are present shall be requested to sign a register evidencing their attendance.

22.11 All envelopes containing Price Bids shall be opened one at a time and the following read out and recorded:

(a) The name of the Bidder;
(b) The Bid Prices, including any discounts and alternative offers; and
(c) Any other details as the Employer may consider appropriate.

Only Price Bids and discounts, read out and recorded during the opening of Price Bids shall be considered for evaluation. No Bid shall be rejected at the opening of Price Bids.

CHIEF ENGINEER
K.P.T

IB.23 Clarification of Bids

23.1 To assist in the examination, evaluation and comparison of bids, the Employer may, at his discretion, ask any bidder for clarification of his bid, including breakdowns of unit rates. The request for clarification and the response shall be in writing but no change in the price or substance of the bid shall be sought, offered or permitted except as required to confirm the correction of arithmetic errors discovered by the Employer in the evaluation of the bids in accordance with Clause IB.26.

23.2 If a Bidder does not provide clarifications of its Bid by the date and time set in the Employer's request for clarification, its bid may be rejected

IB.24 Examination of Bids and Determination of Responsiveness

24.1 Prior to the detailed evaluation of bids, the Employer will determine whether each bid is substantially responsive to the requirements of the Bidding Documents.

24.2 A substantially responsive bid is one which

(i) meets the eligibility and qualification criteria;

(ii) has been properly signed;

(iii) is accompanied by the required Bid Security in original;

(iv) Includes signed Integrity Pact where required as per clause IB.35 and

(v) conforms to all the terms, conditions and specifications of the Bidding Documents, without material deviation or reservation.

A material deviation or reservation is one

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

(ii) which limits in any substantial way, inconsistent with the Bidding Documents, the Employer's rights or the bidder's obligations under the Contract;

(iii) adoption/rectification whereof would affect unfairly the competitive position of other bidders presenting substantially responsive bids. Only substantially responsive bid shall be considered for further evaluation.

24.3 If a bid is not substantially responsive, it may not subsequently be made responsive by correction or withdrawal of the non-conforming material deviation or reservation. The Employer may, however, seek confirmation/ clarification in writing which shall be responded in writing.

IB.25 Correction of Errors

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

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

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

CHIEF ENGINEER
K.P.T

25.2 The amount stated in the Letter of Price Bid will be adjusted by the Employer in accordance with the above procedure for the correction of errors and with the concurrence of the bidder, shall be considered as binding upon the bidder. If the bidder does not accept the corrected Bid Price, his Bid will be rejected, and the Bid Security shall be forfeited in accordance with IB.15.5 (b) hereof.

IB.26 Evaluation and Comparison of Bids

26.1 The Employer will evaluate and compare only the Bids determined to be substantially responsive in accordance with Clause IB.24.

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

(a) Making any correction for errors pursuant to Clause IB.25;
(b) Making an appropriate adjustment for any other acceptable variation or deviation.

26.3 The estimated effect of the price adjustment provisions of the Conditions of Contract, applied over the period of execution of the Contract, shall not be taken into account in Bid evaluation.

26.4 If the Bid or the individual rates quoted with respect to source and delivery of materil, of the successful bidder is seriously unbalanced in relation to the Employer's estimate for respective source r or the cost of work to be performed under the Contract, the Employer may require the bidder to produce detailed price analyses for any or all items of the Bill of Quantities to demonstrate the internal consistency of those prices with the delivery methods and schedule proposed. After evaluation of the price analyses, the Employer may require that the amount of the Performance Security set forth in Clause IB.31 be increased at the expense of the successful bidder to a level sufficient to protect the Employer against financial loss in the event of default of the successful bidder under the Contract.

IB.27 Process to be Confidential

27.1 Subject to Sub-Clause IB.24.1 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.

27.2 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.28 Award

28.1 Subject to Clauses IB.29 and IB.33, 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 most advantageous Bid Price, provided that such bidder has been determined to be eligible in accordance with the provisions of Clause IB.3 and qualify pursuant to IB 28.2

28.2 The Employer, at any stage of the bid evaluation, having credible reasons for or prima facie evidence of any defect in bidder's capacities, may require the bidders 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 in writing. They shall form part of the records of that bid evaluation report.

CHIEF ENGINEER
K.P.T

IB.29 Employer's Right to Accept any Bid and to Reject any or all Bids

29.1 Notwithstanding Clause IB.28, 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 except that the grounds for rejection of all bids shall upon request be communicated to any bidder who submitted a bid, without justification of grounds. Rejection of all bids shall be notified to all bidders promptly.

IB.30 Notification of Award

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

30.2 No Negotiation with the bidder having evaluated as lowest responsive or any other bidder shall be permitted.

30.3 The notification of award and its acceptance by the bidder will constitute the formation of the Contract, binding the Employer and the bidder till signing of the formal Contract Agreement.

30.4 Upon furnishing by the successful bidder of a Performance Security, the Employer will promptly notify the other bidders that their Bids have been unsuccessful and return their bid securities.

IB.31 Performance Security

31.1 The successful bidder shall furnish to the Employer a Performance Security in the form and the amount stipulated in the Bidding Data Sheet and the Conditions of Contract within a period of 14 days after the receipt of Letter of Acceptance.

31.2 Failure of the successful bidder to comply with the requirements of IB.32.1 or IB.33 or IB.35 shall constitute sufficient grounds for the annulment of the award and forfeiture of the Bid Security.

IB.32 Signing of Contract Agreement

32.1 Within 14 days from the date of furnishing of acceptable Performance Security under the Conditions of Contract, the Employer will send the successful bidder the Contract Agreement in the form provided in the Bidding Documents, incorporating all agreements between the parties.

32.2 The formal Agreement between the Employer and the successful bidder shall be executed within 14 days of the receipt of the Contract Agreement by the successful bidder from the Employer.

IB. 33 General Performance of the Bidders

The Employer reserves the right to obtain information regarding performance of the bidders on their previously awarded contracts/works. The Employer may in case of consistent poor performance of any Bidder as reported by the employers of the previously awarded contracts, interalia, reject his bid and/or refer the case to the Pakistan Engineering Council (PEC). Upon such reference, PEC in accordance with its rules, procedures and relevant laws of the land take such action as may be deemed appropriate under the circumstances of the case including black listing of such Bidder and debarring him from participation in future bidding for similar works.

IB.34 Integrity Pact

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

IB.35 Instructions not Part of Contract

Bids shall be prepared and submitted in accordance with these Instructions which are provided to assist bidders in preparing their bids, and do not constitute part of the Bid or the Contract Documents

CHIEF ENGINEER
K.P.T

BIDDING DATA

Instructions to Bidders

Clause Reference

1.1 **Name of Employer:** **Trustees of the Port of Karachi i.e. KPT**

Brief Description of Works

MAINTENANCE / REPAIR AND ROAD PATCH WORK AT VARIOUS LOCATIONS & LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA.

KPT intends to refurbish/ repair/ maintenance of Roads at Lalazar area as per BOQ attached.

5.1 (a) **Employer's address:**

CHIEF ENGINEER,

Civil Works Division
Karachi Port Trust (KPT),
Eduljee Dinshaw Road, Karachi-74000.
Tel No. + 92 21 9921 4318
Fax No. + 92 21 9921 4329 – 30

(b) **Engineer's address:**

CHIEF ENGINEER,
Civil Works Division
Karachi Port Trust (KPT),
Eduljee Dinshaw Road, Karachi-74000.
Tel No. + 92 21 9921 4318
Fax No. + 92 21 9921 4329 - 30

10.1 A The Bidder shall submit with its Technical Bid the following documents:

i. Covering Letter
ii. Written confirmation authorizing the signatory of the Bid to commit the Bidder (IB.18.5)
iii. Form of Technical Bid, duly filled, signed in accordance with submission of the bid.
iv. Bid Security furnished in accordance with IB.15
v. **Documentary evidence in accordance with Clause IB.13 (**Qualification and Experience – Schedule F to Bid
vi. **Documentary evidence in accordance with Clause IB.14**
vii. Schedules to Bid (B to E) duly signed and stamped by the Bidder
viii. Past Performance, Current Commitment
ix. Financial Competence and Access to Financial Resources
x. Pending litigation information

10.1 (B) The Bidder shall submit with its Price Bid the following documents:

i. Letter of Price Bid
ii. Price Adjustment as per Special instructions
iii. Schedule of Price / Bill of Quantities - SCHEDULE A

CHIEF ENGINEER
K.P.T

IB 13 Documents Establishing Bidders' Eligibility and Qualification

13.1 As per Schedule F to Bid

15.1 **Amount of Bid Security: (PKR 800,000.00 Only)** - in the form of pay order in favour of the Chief Accounts Officer, KPT

16.1**Period of Bid Validity:**

180 days

20.1(a) **Deadline for Submission of Bids** - 11:00 **Hrs.** on **13-02-2024.**

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

Venue: Committee Room of CW Division,

Time: 1130.

Date: **13-02-2024.**

CHIEF ENGINEER
K.P.T

FOREIGN CURRENCY REQUIREMENTS

1. The Bidder may indicate here in below his requirements of foreign currency (if any), with reference to various inputs to the Works.

2. Foreign Currency Requirement as percentage of the Bid Price excluding Provisional Sums _____%.

3. Table of Exchange Rates

Unit of Currency	**Equivalent in Pak. Rupees**
Australian Dollar	----------
Euro	----------
Japanese Yen	----------
U.K. Pound	----------
U.S. Dollars	----------
----------	----------
----------	----------

DELTED

CHIEF ENGINEER
K.P.T

Appendix-C To Bid

PRICE ADJUSTMENT UNDER CLAUSE 70 OF CONDITIONS OF CONTRACT

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

(To be filled by the Employer)

Cost Element	Description	Weightages	Applicable index
1	2	3	4
(i)	Fixed Portion	0.30	
(ii)	Local Labour	0.15	Government of Pakistan (GP) Federal Bureau of Statistics (FBS) Monthly Statistical Bulletin.
(iii)	Cement – in bags	0.20	" " "
(iv)	Paver Block / Block /kerb Stone Tiles	0.10	" " "
(v)	High Speed Diesel (HSD) / POL	0	" " "
(vi)	Bricks	____	" " "
(vii)	Bitumen	0.15	" " "
(viii)	UPVC Pipe.	0.10	
	Total	1.000	

Notes:

1) Indices for "(ii)" to "(viii)" 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.

CHIEF ENGINEER
K.P.T

BILL OF QUANTITIES

A. Preamble

1. The Bill of Quantities shall be read in conjunction with the Conditions of Contract, Specifications and Drawings.

2. The quantities given in the Bill of Quantities are estimated and provisional, and are given to provide a common basis for bidding. The basis of payment will be the actual quantities of work executed and measured by the Contractor and verified by the Engineer and valued at the rates and prices entered in the priced Bill of Quantities, where applicable, and otherwise at such rates and prices as the Engineer may fix as per the Contract.

3. The rates and prices entered in the priced Bill of Quantities shall, except insofar as it is otherwise provided under the Contract include all costs of Contractor's plant, labour , supervision, materials, execution, insurance, profit, taxes and duties, together with all general risks, liabilities and obligations set out or implied in the Contract. Furthermore all duties, taxes and other levies payable by the Contractor under the Contract, or for any other cause, as on the date 28 days prior to deadline for submission of Bids, shall be included in the rates and prices and the total Bid Price submitted by the Bidder.

4. A rate or price shall be entered against each item in the priced Bill of Quantities, whether quantities are stated or not. The cost of items against which the Contractor will have failed to enter a rate or price shall be deemed to be covered by other rates and prices entered in the Bill of Quantities.

5. The whole cost of complying with the provisions of the Contract shall be included in the items provided in the priced Bill of Quantities, and where no items are provided, the cost shall be deemed to be distributed among the rates and prices entered for the related items of the Works.

6. General directions and description of work and materials are not necessarily repeated nor summarised in the Bill of Quantities. References to the relevant sections of the Bidding Documents shall be made before entering prices against each item in the priced Bill of Quantities

7. Provisional sums included and so designated in the Bill of Quantities shall be expended in whole or in part at the direction and discretion of the Engineer in accordance with Sub-Clause 58.2 of Part I, General Conditions of Contract.

Day work Schedule

We understand and agree that for execution of any work on the basis of Daywork the written order of the Engineer is required.

The Contractor will be paid for work in respect of which he is directed by written order of the Engineer to perform as Daywork, on the basis and at the rates and prices set forth herein.

CHIEF ENGINEER
K.P.T

Workmen:

Workmen hours and other costs towards day works shall be paid in Pak Rupees only, in accordance with the following schedule:

S.NO.	Type of Workmen	(First Class)	Rate per hour (Rupees)
1.	Carpenter	"	250.00
2.	Mason	"	250.00
3.	Plumber/Fitter	"	250.00
4.	Electrician	"	250.00
5.	Mechanic	"	250.00
6.	Welder	"	250.00
7.	Painter	"	250.00
8.	Black smith/fixer	"	250.00
9.	Machine Operator	"	250.00
10.	Semi skilled	"	220.00
11.	Un skilled	"	187.50

(1) The above hourly rates include percentage addition of 25% to cover the Contractor's profit, overhead charges, superintendence and insurance; all allowances of workmen and other clerical and office work, the use, repair and sharpening of tools, the use of consumable stores and electrical power; the use of non-mechanical plant and scaffolding, the use of water, lighting and appliances of all descriptions; supervision by Contractor's staff, foremen, gangers, and all other incidental charges whatsoever.

(2) The Contractor shall carry out all Day Work, within normal working hours unless the Engineer has given written approval to the contrary. Payment of workmen employed on Day Work performed outside normal working hours will be made at overtime rate only if the Engineer has given such approval. Rate for overtime shall be the rate indicated above plus 50% increase for overtime work.

Materials:

Materials to be supplied for Day work which are actually incorporated into the Works shall be paid for at the invoiced price for locally procured materials of local or foreign origin delivered to Site plus surcharge of 25% for cartage and handling from source to site, wastage and Contractor's overhead and profit.

Any payment made for Day work shall be final.

Plant:

Any plant used for Day work shall be charged at the hire rates entered by us in Appendix "G" to the Form of Tender or if not listed herein, at comparable rates.

The hire rate of construction plant and equipment entered in Appendix ‘G’ shall be applicable only for work done on the basis of Day work provisions.

CHIEF ENGINEER
K.P.T

PROPOSED CONSTRUCTION SCHEDULE

Pursuant to Sub-Clause 43.1 of the General Conditions of Contract, the Works shall be completed on or before the date stated in Appendix-A to Bid. The Bidder shall provide as Appendix-E to Bid, the Construction Schedule in the bar chart (CPM, PERT or any other to be specified herein) showing the sequence of work items and the period of time during which he proposes to complete each work item in such a manner that his proposed programme for completion of the whole of the Works and parts of the Works may meet Employer's completion targets in days noted below and counted from the date of receipt of Engineer's Notice to Commence (Attach sheets as required for the specified form of Construction Schedule):

	Description	**Time for Completion**
a)	Whole Works	Six (06) Months.

CHIEF ENGINEER
K.P.T

METHOD OF PERFORMING THE WORK

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

1. Organization Chart indicating head office and field office personnel involved in management and supervision, engineering, equipment maintenance and purchasing.

2. Mobilization in Pakistan, the type of facilities including personnel accommodation, office accommodation, provision for maintenance and for storage, communications, security and other services to be used.

3. The method of executing the Works, the procedures for installation of equipment and machinery and transportation of equipment and materials to the site.]

4 Proper following of EHS standards during the execution is to be ensured by the Contract.

5 The Contractor is liable to ensure all the insuarances from worker safety / health to insuarance of equipments.

6 All the services and setting up of Contractor Office facility on site shall be borne by the Contractor Himself (inclusive of Electricity required at site)

CHIEF ENGINEER
K.P.T

BG-1
Appendix-G to Bid

LIST OF MAJOR EQUIPMENT – RELATED ITEMS

[The Bidder will provide on Sheet 2 of this Appendix a list of all major equipment and related items, under separate heading for items owned, to be purchased or to be arranged on lease by him to carry out the Works. The information shall include make, type, capacity, and anticipated period of utilization for all equipment which shall be in sufficient detail to demonstrate fully that the equipment will meet all requirements of the Specifications.]

CHIEF ENGINEER
K.P.T

Appendix-G to Bid

LIST OF MAJOR EQUIPMENT

Owned Purchased or Leased	Description of Unit (Make, Model, Year)	Capacity HP Rating	Condition	Present Location or Source	Date of Delivery at Site	Period of Work on Project
1	2	3	4	5	6	7
a. Owned						
b. To be Purchased						
c. To be arranged on Lease						

CHIEF ENGINEER
K.P.T

CONSTRUCTION CAMP AND HOUSING FACILITIES

The Contractor in accordance with Clause 34 of the Conditions of Contract shall provide description of his construction camp's facilities and staff housing requirements.

The Contractor shall be responsible for pumps, electrical power, water and electrical distribution systems, and sewerage system including all fittings, pipes and other items necessary for servicing the Contractor's construction camp.

The Bidder shall list or explain his plans for providing these facilities for the service of the Contract as follows:

1. Site Preparation (clearing, land preparation, etc.).

2. Provision of Services.

    a) Power (expected power load, etc.).
    b) Water (required amount and system proposed).
    c) Sanitation (sewage disposal system, etc.).

3. Construction of Facilities

    a) Contractor's Office. Workshop and Work Areas (areas required and proposed layout, type of construction of buildings, etc.).
    b) Warehouses and Storage Areas (area required, type of construction and layout).
    c) Housing and Staff Facilities (Plans for housing for proposed staff, layout, type of construction, etc.).

4. Construction Equipment Assembly and Preparation (detailed plans for carrying out this activity).

5. Other Items Proposed (Security services, etc.).

CHIEF ENGINEER
K.P.T

KARACHI PORT TRUST

ENGINEERING DEPARTMENT

SPECIAL STIPULATION

SUB: Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Storm Water Drain Line At Lalazar Area .

CONSTRUCTION CAMP.

1. The Contractor shall provide / construct a temporary site office of area not less than 120 SQFT in which he provided the necessary office automation, viz:

   a. Office Table and Chairs.
   b. Visiting Chairs
   c. Computer automation including Latest one Core i7 (10^{th} Gen) desktop computer of approved brand with laser jet Pro M203 Jw printer and HP scanner or Equivalent.
   d. Water Dispenser with Water bottles of reputed quality in sufficient quantity.
   e. Photo State Machine (Ricoh or Equivalent).
   f. Other ancillary Items for office use.

2. The contractor shall be responsible for Pumps, Electrical Power, Water and Electrical distribution System including all fittings, Pipes and Other Items necessary for serving the Contractor's Construction camp.

3. The bidder shall list or explain his plans for providing these facilities for the service of the Contract as follows:

   i. Site Preparation (Cleaning , land preparation etc.)

   ii. Provision of Services.

      a. Power (expected power load, etc)

      b. Water (required amount and system proposed)

      c. Sanitation (Sewage disposal system, etc).

   iii. Construction of facilities:

      a. Contractor's office, (para-1 above) Workshop and Work Areas (area required and proposed layout, type of Construction of Building, etc)

      b. Warehouse and Storage Areas (area required and proposed layout).

   iv. Construction Equipment Assembly and Preparation (Detail Plans for carrying out this activity).

   v. Other Items Proposed (Security Services, etc).

   vi. After the completion of the work the Office Automation in Para-1. (c, d & e) will revert to the employer free of cost. The contractor shall include the cost of the above facility in the rates of the items of BOQ and no additional / separate payment would be made for the above mentioned facilities.

   vii. The Contractor must inspect the site & condition of the existing area, before tendering general conditions of contract, drawing & bill of quantity shall be read in conjunction with these specification.

   Although the specification are sub divided under different headings, every part of it shall be deemed supplementary to and complementary to every other part and shall be read with it or into it so far as it may be practicable to do so.

CHIEF ENGINEER
K.P.T

a) The work has to be carried out at site in portions so as to cause the least dislocation to the flow of traffic on road it is proposed to deliver the site to the contractor in convenient portions so that the contractor completes the work in one portion and takes delivery of the next and hands over the completed portion to the Engineer for being put to use. However contractor may suggest alternate facing for approval of engineer to suit the conditions at site during the execution of the work.

b) The material required for the work should be brought at site of works in convenient lots which will be determined by the Engineer on basis of programme to be furnished by the contractors.

c) All existing services such as cables, mains pipes above or below the ground encountered during the course of work are to be maintained by the contractor in position and it working order, the cost of temporary supports and protection shall be borne by the contractor

d) The contractor will take all necessary precautions against fire hazard and arrange stand-by services of the fire staff at his own cost if necessary.

e) The contractors will include in their rate for providing barricading the job at site which will be needed at site for efficient and correct execution of work.

f) The contractor must inspect the site to assess regarding rates. The Contractor have to make proper provision in rates for filling all pot holes, signage, potion and damages slab to bring surface in one level.

g) The contractor has to provide job mix design formula of asphalt concrete from recognized soil and material testing laboratory as per approval for Engineer Incharge.

h) The contractor has to make testing arrangements at site through recognized soil and material testing laboratory as per approval of the Engineer Incharge.

i) The work is to be carried out in working time in case of stoppage of work due to any incident or due to strike and other reason no claim of the contractor is to be entertained.

j) The facilities of Construction Camp will be provided by the Contractor within 15 days from Date of Award, if fails to do so. No Payment will made to contractor for any of the IPC & a deduction on this account will made as per Current Market Prices at the discretion of Employer / Engineer.

CHIEF ENGINEER
K.P.T

ESTIMATED PROGRESS PAYMENTS

Bidder's estimate of the value of work which would be executed by him during each of the periods stated below, based on his Programme of the Works and the Rates in the Bill of Quantities, expressed in thousands of Pakistani Rupees:

Months	**Amounts (1,000 Rs.)**
1	**2**
Ist Month	
2nd Month	
3rd Month	
4th Month	
5th Month	
6th Month	
Total Bid Price	

CHIEF ENGINEER
K.P.T

ORGANIZATION CHART
FOR THE

SUPERVISORY STAFF AND LABOUR

CHIEF ENGINEER
K.P.T

(INTEGRITY PACT)

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

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

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

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

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

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

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

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

CHIEF ENGINEER
K.P.T

FORMS

BID SECURITY

PERFORMANCE SECURITY

CONTRACT AGREEMENT

MOBILIZATION ADVANCE GUARANTEE/BOND

CHIEF ENGINEER
K.P.T

BID SECURITY

(**Pay Order in Favour of Chief Accounts Officer, KPT)**

Security Executed on _____

(Date)

Name of Surety (Bank) with Address: _____

(Scheduled Bank in Pakistan)

Name of Principal (Bidder) with Address _____

_____

Penal Sum of Security Rupees . _____(Rs. _____)

Bid Reference No. _____

KNOW ALL MEN BY THESE PRESENTS, that in pursuance of the terms of the Bid and at the request of the said Principal (Bidder) we, the Surety above named, are held and firmly bound unto _____

(hereinafter called the 'Employer') in the sum stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the Bidder has submitted the accompanying Bid dated _____ for Bid No. _____ for_____(Particulars of Bid) to the said Employer; and

WHEREAS, the Employer has required as a condition for considering said Bid that the Bidder furnishes a Bid Security in the above said sum from a Scheduled Bank in Pakistan or from a foreign bank duly counter-guaranteed by a Scheduled Bank in Pakistan, to the Employer, conditioned as under:

(1) that the Bid Security shall remain in force up to and including the date 28 days after the deadline for validity of bids as stated in the Instructions to Bidders or as it may be extended by the Employer, notice of which extension(s) to the Surety is hereby waived;

(2) that the Bid Security of unsuccessful Bidders will be returned by the Employer after expiry of its validity or upon signing of the Contract Agreement; and

(3) that in the event of failure of the successful Bidder to execute the proposed Contract Agreement for such work and furnish the required Performance Security, the entire said sum be paid immediately to the said Employer pursuant to Clause 15.6 of the Instruction to Bidders 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 with the said Employer in accordance with his Bid as accepted and furnish within twenty eight (28) days of his being requested to do so, a Performance Security with good and sufficient surety, as may be required, upon the form prescribed by the said Employer for the faithful performance and proper fulfilment of the said Contract or in the event of non-withdrawal of the said Bid within the time specified for its validity then this obligation shall be void and of no effect, but otherwise to remain in full force and effect.

CHIEF ENGINEER
K.P.T

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

PROVIDED ALSO THAT the Employer shall be the sole and final judge for deciding whether the Principal (Bidder) has duly performed his obligations to sign the Contract Agreement and to furnish the requisite Performance Security within the time stated above, or has defaulted in fulfilling said requirements and the Surety shall pay without objection the said sum upon demand from the Employer forthwith and without any reference to the Principal (Bidder) or any other person.

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

SURETY (Bank)

WITNESS:

Signature _____

1. _____

Name _____

_____

Title _____

Corporate Secretary (Seal)

Corporate Guarantor (Seal)

2. _____

_____

Name, Title & Address

CHIEF ENGINEER
K.P.T

FORM OF PERFORMANCE SECURITY

(Bank Guarantee)

Guarantee No._____
Executed _____
Expiry Date _____

[Letter by the Guarantor to the Employer]

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

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 fulfil all the undertakings, covenants, terms and conditions of the said Documents during the original term 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 fulfil all the undertakings, covenants terms and conditions of the Contract and of any and all modifications of said Documents that may hereafter be made, notice of which modifications to the Guarantor being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue till all requirements of Clause 49, Defects Liability, 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.

CHIEF ENGINEER
K.P.T

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 argument 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 used or failed to perform the obligations under the Contract which payment will be effected by the Guarantor to Employer's designated Bank & Account Number.

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

_____
Guarantor (Bank)

Witness:

1. _____ Signature _____

_____

_____ Name _____

Corporate Secretary (Seal)

Title _____

2. _____

_____

_____ _____

Name, Title & Address Corporate Guarantor (seal)

CHIEF ENGINEER
K.P.T

FORM OF CONTRACT AGREEMENT

THIS CONTRACT AGREEMENT (hereinafter called the "Agreement") made on the _____ day of_____ (month) 20_____ between _____ (hereafter called the "Employer") of the one part and _____ (hereafter 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 witnesses 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 Contract Agreement;
   (b) The Letter of Acceptance;
   (c) The completed Form of Bid;
   (d) Special Stipulations (Appendix-A to Bid);
   (e) The Particular Conditions of Contract – Part II;
   (f) The General Conditions – Part I;
   (g) The priced Bill of Quantities (Appendix-D to Bid);
   (h) The completed Appendices to Bid (B, C, E to L);
   (i) The Drawings;
   (j) The Specifications.
   (k) _____ (any other)

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

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

Signature of the Contactor	Signature of Employer
_____	_____
(Seal)	(Seal)
Signed, Sealed and Delivered in the presence of:	
Witness:	Witness:
_____	_____
(Name, Title and Address)	(Name, Title and Address)

CHIEF ENGINEER
K.P.T

MG-1

MOBILIZATION ADVANCE GUARANTEE/BOND

Guarantee No._____ Date _____

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

(Particulars of Contract)

with _____ (hereinafter called the "Contractor').

AND WHEREAS, the Employer has agreed to advance to the Contractor, at the Contractor's request, an amount of Rupees _____ (Rs _____) 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 for the mobilization advance for the performance of his obligations under the said Contract.

AND WHEREAS, _____

(Scheduled Bank in Pakistan acceptable to the Employer)

(hereinafter called the "Guarantor") at the request of the Contractor, has agreed with the Employer agreeing to make the above advance to the Contractor, has agreed to furnish said Guarantee.

NOW, THEREFORE, the Guarantor hereby guarantees that the Contractor shall use the advance for the purpose of above mentioned Contract and if he fails and commits default in fulfilment of any of his obligations for which the advance payment is made, the Guarantor shall be liable to the Employer for payment not exceeding the aforementioned amount.

Notice in writing of any default, of which the Employer shall be the sole and final judge, 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 that are due under this Guarantee without any reference to the Contractor and without any objection.

This Guarantee shall remain in force until the advance is fully adjusted against payments from the Interim Payment Certificates of the Contractor or until _____whichever is earlier. (Date)

The Guarantor's liability under this Guarantee shall not in any case exceed the sum of Rupees _____(Rs _____).

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

DELETED

MG-2

GUARANTOR

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

WITNESS

1. _____

   _____

   Corporate Secretary (Seal)

2. _____ _____

   (Name Title & Address) Corporate Guarantor(Seal)

CHIEF ENGINEER
K.P.T

FEDERATION INTERNATIONAL DES INGENIEURS- CONSEILS

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

CONTENTS

CHIEF ENGINEER
K.P.T

PART I: GENERAL CONDITIONS

CHIEF ENGINEER
K.P.T

Definitions and Interpretation

1.1 Definitions
1.2 Headings and Marginal Notes
1.3 Interpretation
1.4 Singular and Plural
1.5 Notices, Consents, Approvals, Certificates and Determinations

Engineer and Engineer's Representative

2.1 Engineer's Duties and Authority
2.2 Engineer's Representative
2.3 Engineer's Authority to Delegate
2.4 Appointment of Assistants
2.5 Instructions in Writing
2.6 Engineer to Act Impartially

Assignment and Subcontracting

3.1 Assignment of Contract
4.1 Subcontracting
4.2 Assignment of Subcontractors' Obligations

Contract Documents

5.1 Language/s and Law
5.2 Priority of Contract Documents
6.1 Custody and Supply of Drawings and Documents
6.2 One Copy of Drawings to be Kept on Site
6.3 Disruption of Progress
6.4 Delays and Cost of Delay of Drawings
6.5 Failure by Contractor to Submit Drawings
7.1 Supplementary Drawings and Instructions
7.2 Permanent Works Designed by Contractor
7.3 Responsibility Unaffected by Approval

General Obligations

8.1 Contractor's General Responsibilities
8.2 Site Operations and Methods of Construction
9.1 Contract Agreement
10.1 Performance Security
10.2 Period of Validity of Performance Security
10.3 Claims under Performance Security
11.1 Inspection of Site

12.1 Sufficiency of Tender
12.2 Not Foreseeable Physical Obstructions or Conditions
13.1 Work to be in Accordance with Contract
14.1 Programme to be Submitted
14.2 Revised Programme

CHIEF ENGINEER
K.P.T

14.3 Cash Flow Estimate to be Submitted
14.4 Contractor not Relieved of Duties or Responsibilities
15.1 Contractor's Superintendence
16.1 Contractor's Employees
16.2 Engineer at Liberty to Object
17.1 Setting-out
18.1 Boreholes and Exploratory Excavation
19.1 Safety, Security and Protection of the Environment
19.2 Employer's Responsibilities
20.1 Care of Works
20.2 Responsibility to Rectify Loss or Damage
20.3 Loss or Damage Due to Employer's Risks
20.4 Employer's Risks
21.1 Insurance of Works and Contractor's Equipment
21.2 Scope of Cover
21.3 Responsibility for Amounts not Recovered
21.4 Exclusions
22.1 Damage to Persons and Property
22.2 Exceptions
22.3 Indemnity by Employer
23.1 Third Party Insurance (including Employer's Property)
23.2 Minimum Amount of Insurance
23.3 Cross Liabilities
24.1 Accident or Injury to Workmen
24.2 Insurance Against Accident to Workmen
25.1 Evidence and Terms of Insurances
25.2 Adequacy of Insurances
25.3 Remedy on Contractor's Failure to Insure
25.4 Compliance with Policy Conditions
26.1 Compliance with Statutes, Regulations
27.1 Fossils
28.1 Patent Rights
28.2 Royalties
29.1 Interference With Traffic and Adjoining Properties
30.1 Avoidance of Damage to Roads
30.2 Transport of Contractor's Equipment or Temporary Works
30.3 Transport of Materials or Plant
30.4 Waterborne Traffic
31.1 Opportunities for Other Contractors
31.2 Facilities for Other Contractors
32.1 Contractor to Keep Site Clear
33.1 Clearance of Site on Completion

Labour

34.1 Engagement of Staff and Labour
35.1 Returns of Labour and Contractor's Equipment

Materials, Plant and Workmanship

36.1 Quality of Materials, Plant and Workmanship
36.2 Cost of Samples
36.3 Cost of Tests
36.4 Cost of Tests not Provided for
36.1 Quality of Materials, Plant and Workmanship
36.2 Cost of Samples
36.3 Cost of Tests
36.4 Cost of Tests not Provided for
36.5 Engineer's Determination where Tests not Provided for

CHIEF ENGINEER
K.P.T

37.1 Inspection of Operations
37.2 Inspection and Testing
37.3 Dates for Inspection and Testing
37.4 Rejection
37.5 Independent Inspection
38.1 Examination of Work before Covering up
38.2 Uncovering and Making Openings
39.1 Removal of Improper Work, Materials or Plant
39.2 Default of Contractor in Compliance

Suspension

40.1 Suspension of Work
40.2 Engineer's Determination following Suspension
40.3 Suspension lasting more than 84 Days

Commencement and Delays

41.1 Commencement of Works
42.1 Possession of Site and Access Thereto
42.2 Failure to Give Possession
42.3 Rights of Way and Facilities
43.1 Time for Completion
44.1 Extension of Time for Completion
44.2 Contractor to Provide Notification and Detailed Particulars
44.3 Interim Determination of Extension
45.1 Restriction on Working Hours
46.1 Rate of Progress
47.1 Liquidated Damages for Delay
47.2 Reduction of Liquidated Damages
48.1 Taking-Over Certificate
48.2 Taking-Over of Sections or Parts
48.3 Substantial Completion of Parts
48.4 Surfaces Requiring Reinstatement

Defects Liability

49.1 Defects Liability Period
49.2 Completion of Outstanding Work and Remedying Defects
49.3 Cost of Remedying Defects
49.4 Contractor's Failure to Carry Out Instructions
50.1 Contractor to Search

Alterations, Additions and Omissions

51.1 Variations
51.2 Instructions for Variations
52.1 Valuation of Variations
52.2 Power of Engineer to Fix Rates
52.3 Variations Exceeding 15 percent
52.4 Daywork
53.1 Notice of Claims
53.2 Contemporary Records
53.3 Substantiation of Claims
53.4 Failure to Comply
53.5 Payment of Claims

Contractor's Equipment, Temporary Works and Materials

54.1 Contractor's Equipment, Temporary Works and Materials; Exclusive Use for the Works.
54.2 Employer not Liable for Damage
54.3 Customs Clearance
54.4 Re-export of Contractor's Equipment
54.5 Conditions of Hire of Contractor's Equipment
54.6 Costs for the Purpose of Clause 63
54.7 Incorporation of Clause in Subcontracts
54.8 Approval of Materials not Implied

CHIEF ENGINEER
K.P.T

Measurement

55.1 Quantities
56.1 Works to be Measured
57.1 Method of Measurement
57.2 Breakdown of Lump Sum Items

Provisional Sums

58.1 Definition of "Provisional Sum"
58.2 Use of Provisional Sums
58.3 Production of Vouchers

Nominated Subcontractors

59.1 Definition of "Nominated Subcontractors"
59.2 Nominated Subcontractors; Objection to Nomination
59.3 Design Requirements to be Expressly Stated
59.4 Payments to Nominated Subcontractors
59.5 Certification of Payments to Nominated Subcontractors

Certificates and Payment

60.1 Monthly Statements
60.2 Monthly Payments
60.3 Payment of Retention Money
60.4 Correction of Certificates
60.5 Statement at Completion
60.6 Final Statement
60.7 Discharge
60.8 Final Payment Certificate
60.9 Cessation of Employer's Liability
60.10 Time for Payment
61.1 Approval only by Defects Liability Certificate
62.1 Defects Liability Certificate
62.2 Unfulfilled Obligations

Remedies

63.1 Default of Contractor
63.2 Valuation at Date of Termination
63.3 Payment after Termination
63.4 Assignment of Benefit of Agreement
64.1 Urgent Remedial Work

Special Risks

65.1 No Liability for Special Risks
65.2 Special Risks
65.3 Damage to Works by Special Risks
65.4 Projectile, Missile
65.5 Increased Costs arising from Special Risks
65.6 Outbreak of War
Removal of Contractor's Equipment on Termination

65.8 Payment if Contract Terminated

Release from Performance

66.1 Payment in Event of Release from Performance

Settlement of Disputes

67.1 Engineer's Decision
67.2 Amicable Settlement
67.3 Arbitration
67.4 Failure to Comply with Engineer's Decision

CHIEF ENGINEER
K.P.T

Notices

68.1 Notice to Contractor
68.2 Notice to Employer and Engineer
68.3 Change of Address

Default of Employer

69.1 Default of Employer
69.2 Removal of Contractor's Equipment
69.3 Payment on Termination
69.4 Contractor's Entitlement to Suspend Work
69.5 Resumption of Work

Changes in Cost and Legislation

70.1 Increase or Decrease of Cost
70.2 Subsequent Legislation

Currency and Rates of exchange

71.1 Currency Restrictions
72.1 Rates of Exchange
72.2 Currency Proportions
72.3 Currencies of Payment for Provisional Sums

REFERENCE TO PART II
INDEX
TENDER (NOT USED)
AGREEMENT (NOT USED)

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

(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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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 instructions 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.

CHIEF ENGINEER
K.P.T

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 there under, 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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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 superintendence, 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

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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,

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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 or 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) ionizing 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,

CHIEF ENGINEER
K.P.T

(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, form 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,

CHIEF ENGINEER
K.P.T

(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.

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 insured.

CHIEF ENGINEER
K.P.T

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

CHIEF ENGINEER
K.P.T

(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 therefore.

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.

CHIEF ENGINEER
K.P.T

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

(d) 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.

CHIEF ENGINEER
K.P.T

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) particularized 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.

CHIEF ENGINEER
K.P.T

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 particularized, 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.

CHIEF ENGINEER
K.P.T

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 therefore, 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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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 proceeded 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,

CHIEF ENGINEER
K.P.T

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 recognized 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 recognized 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.

CHIEF ENGINEER
K.P.T

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 Woks 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).

CHIEF ENGINEER
K.P.T

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 Remedying 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 Remedying 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 i n 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.

CHIEF ENGINEER
K.P.T

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, quality 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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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 therefore 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 therefore 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.

CHIEF ENGINEER
K.P.T

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 endeavors 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 endeavors 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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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 therefore 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

DELETED

CHIEF ENGINEER
K.P.T

(b) that the nominated Subcontractor will save harmless and indemnity the Contractor from and against any negligence by the nominated Subcontractor, his agents, workmen and servants and from 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

DELETED

DELETED

DELETED

DELETED

CHIEF ENGINEER
K.P.T

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 60 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

CHIEF ENGINEER
K.P.T

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 28 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").

CHIEF ENGINEER
K.P.T

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 60 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 60 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 60 days, after such Final Payment Certificate has been delivered to the Employer.

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

CHIEF ENGINEER
K.P.T

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:

CHIEF ENGINEER
K.P.T

(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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

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 endeavor 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.

CHIEF ENGINEER
K.P.T

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 heparties 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.

CHIEF ENGINEER
K.P.T

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 60 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,

CHIEF ENGINEER
K.P.T

(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 dispatch, 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

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

LETTERS OF TECHNICAL BID/ PRICE BID,

AND

SCHEDULES TO BID

CHIEF ENGINEER
K.P.T

Letter of Technical Bid

Date: -
Bid Reference No.: E/N-2(109)/

NAME OF WORK: Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Storm Water Drain Line At Lalazar Area.

To:

CHIEF ENGINEER,
Civil Works Division
Karachi Port Trust (KPT),
Eduljee Dinshaw Road, Karachi-74000.
Tel No. + 92 21 9921 4318
Fax No. + 92 21 9921 4329 – 30

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB) 8;

(b) We offer to execute and complete in conformity with the Bidding Documents the following Works:

(c) Our Bid consisting of the Technical Bid and the Price Bid shall be valid for a period of **180 days** from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(d) As security for due performance of the under takings and obligations of our bid, we submit here with a Bid security, in the amount specified in Bidding Data Sheet, which is valid (at least) 28 days beyond validity of Bid itself.

(e) We are not participating, as a Bidder or as a subcontractor, in more than one bid in this bidding process, other than alternative offers submitted in accordance with IB16 (as applicable) .

(f) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB / BDS.10.1A of the Bidding Data Sheet.

Name .....
In the capacity of .....
Signed .....
.....

Duly authorized to sign the Bid for and on behalf of .....

Date Address……..

CHIEF ENGINEER
K.P.T

Letter of Price Bid

Date: ----- Dec' 2023
Bid Reference No.: E/CW-26(531)/

Name of Work: **Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Storm Water Drain Line At Lalazar Area.**

To:

CHIEF ENGINEER,
Civil Works Division
Karachi Port Trust (KPT),
Eduljee Dinshaw Road, Karachi-74000.
Tel No. + 92 21 9921 4318
Fax No. + 92 21 9921 4329 - 30

We, the undersigned, declare that:

(a) We have examined and have no reservations to the Bidding Documents, including Addenda issued in accordance with Instructions to Bidders (IB)8;

(b) The total price of our Bid, excluding any discounts offered in item (c) below is:

(c) The discounts offered and the methodology for their application are:

(d) Our Bid shall be valid for a period of **180 days** from the date fixed for the bid submission deadline in accordance with the Bidding Documents, and it shall remain binding upon us and may be accepted at any time before the expiration of that period;

(e) If our Bid is accepted, we commit to obtain a performance security in accordance with the Bidding Documents;

(f) We understand that this bid, together with your written acceptance thereof included in your notification of award, shall constitute a binding contract between us, until a formal contract is prepared and executed and we do hereby declare that the Bid is made without any collusion, comparison of figures or arrangement with any other bidder for the Works.

(g) We understand that you are not bound to accept the lowest evaluated bid or any other bid that you may receive.

(h) We agree to permit Employer or its representative to inspect our accounts and records and other documents relating to the bid submission and to have them audited by auditors. This permission is extended for verification of any information provided in our Technical Bid which comprises all documents enclosed herewith in accordance with IB / BDS.10.1B of the Bidding Data Sheet.

(i) If awarded the contract, the person named below shall act as Contractor's Representative.

Name .....

In the capacity of .....

Signed .....

Duly authorized to sign the Bid for and on behalf of .....

Date .....

Address……..

CHIEF ENGINEER
K.P.T

SCHEDULES TO BID INCLUDE THE FOLLOWING:

FOR SUBMISSION OF TECHNICAL & FINANCIAL BID:

All schedules shall be signed and stamped

- Schedule B to Bid: Specific Works Data duly signed and stamped by the Bidder
- Schedule C to Bid: Proposed Programme of Works
- Schedule D to Bid: Method of Performing Works
- Schedule E to Bid: Integrity Pact
- Documentary evidence in accordance with Clause IB.13 (Qualification and Experience – Schedule F to Bid-
- Documentary evidence in accordance with Clause IB.14
- Past Performance, Current Commitment
- Financial Competence and Access to Financial Resources-
- Pending litigation information
- Priced BOQ

CHIEF ENGINEER
K.P.T

PART–II : PARTICULAR CONDITIONS OF CONTRACT

CHIEF ENGINEER
K.P.T

PART II - PARTICULAR CONDITIONS OF CONTRACT

1.1 Definitions

(a) (i) The Employer is Karachi Port Trust (KPT) at KPT Head Office Building, Eduljee Dinshaw Road, Karachi-74000, Pakistan.

(a) (iv) The Engineer is **CHIEF ENGINEER, ENGINEERING DEPARTMENT KPT KARACHI PORT TRUST** or any other competent person appointed by the Employer, and notified to the Contractor, to act in replacement of the Engineer. Provided always that except in cases of professional misconduct, the outgoing Engineers is to formulate his certifications/recommendations in relation to all outstanding matters, disputes and claims relating to the execution of the Works during his tenure.
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 there from 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 here below, 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.

CHIEF ENGINEER
K.P.T

(xiii) Issuance of "Defects Liability Certificate" under Sub-Clause 62.1.

(xiv) The Contractor after getting approval from Engineer will sub-let the Fire Fighting Work to the Specialized Firm as per direction and scope of work.

* (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."

5.1Language(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.

CHIEF ENGINEER
K.P.T

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 2 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 2 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 10% of the Contract Price stated in the Letter of Acceptance. Such Security shall, at the option of the bidder, be in the form of either (a) bank guarantee from any Scheduled Bank in Pakistan or (b) bank guarantee from a bank located outside Pakistan duly counter-guaranteed by a Scheduled Bank in Pakistan.

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

The following Sub-Clause10.4 is added:

CHIEF ENGINEER
K.P.T

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 thirty (28) days from the date of receipt of Letter of Acceptance, which shall be in the form of:

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:

CHIEF ENGINEER
K.P.T

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

CHIEF ENGINEER
K.P.T

(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.

21.4 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.

CHIEF ENGINEER
K.P.T

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 recognized 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 neighbor hood 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 Service

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:

CHIEF ENGINEER
K.P.T

47.3 Bonus for Early Completion of Works

Delete this sub clause in its entirety.

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.

54.5 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”.

60.2 Monthly Payments

In the first line, “28” is substituted by “60”.

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 21 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 60 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

CHIEF ENGINEER
K.P.T

the times stated, the Employer shall pay to the Contractor compensation at the 28 days rate of LIBOR+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.

60.11 Secured Advance on Materials

(a) The Contractor shall be entitled to receive from the Employer Secured Advance against **Bank Guarantee** acceptable to 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 the 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 materials on Site together with such documents as may be required by the Engineer for purpose of valuation of materials and providing evidence of ownership and payment therefore;

(5) Owner ship 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

(DELETED)

Financial assistance shall be made available to the Contractor by the Employer by adopting following**:**

(a) An interest-free Mobilization Advance up to 10 % of the Contract Price stated in the Letter of Acceptance shall be paid by the Employer to the Contractor in two equal parts upon submission by the Contractor of a Mobilization Advance Guarantee/Bond for the full amount of the Advance in the specified form from a Scheduled Bank in Pakistan or an insurance company acceptable to the Employer:

(1) First part within 14 days after signing of the Contract Agreement or date of receipt of Engineer's Notice to Commence, whichever is earlier; and

(2) Second part within 42 days from the date of payment of the first part, subject to the satisfaction of the Engineer as to the state of mobilization of the Contractor.

(c) This Advance shall be recovered in equal installments; first installment at the expiry of third month and the last installment one months before the date of completion of the Works as per Clause 43 hereof.

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.

CHIEF ENGINEER
K.P.T

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 is Karachi Port Trust (KPT) at KPT Head Office Building, Eduljee Dinshaw Road, Karachi-74000, Pakistan.

70.1 Increase or Decrease of Cost

Sub-Clause 70.1 is deleted in its entirety, and substituted with the following:

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:-

$$Pn = A + b\frac{Ln}{Lo} + c\frac{Mn}{Mo} + d\frac{En}{Eo} + \ldots\ldots\ldots\ldots\ldots$$

Where:

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).

CHIEF ENGINEER
K.P.T

(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.

(c) 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.

(d) 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.

(e) 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 a1 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, 77.1and 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.

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.

CHIEF ENGINEER
K.P.T

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.

CHIEF ENGINEER
K.P.T

KARACHI PORT TRUST

MAINTENANCE / REPAIR AND ROAD PATCH WORK AT VARIOUS LOCATIONS & LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA.

BIDDING DOCUMENT

VOLUME – II

Jun-2024

SPECIFICATION:

SPECIAL & TECHNICAL PROVISION

CIVIL WORKS DIVISION

=

CHIEF ENGINEER
K.P.T

ITEM – 1 GENERAL

1.1 COMPONENT PARTS

The component parts of this contract i.e. Drawings, the Specifications, and Description of items/Bill of Quantities shall be read together, in accordance with assigned precedence as given elsewhere in the contract.

1.2 CLARIFICATION

Description of items of work in the Bills of Quantities are in the nature of specification and are deemed to be the part of these specification. In case the Contractor finds any conflict between the description of items and the detailed text in the volume of specifications the same shall be got clarified by him before submission of the bids whereupon an addendum might be issued to all the bidders. After award of work the discretion of interpretation and applicability shall rest with the Engineer whose decision shall be final and binding without any increase either in cost or completion time.

Any item for which no specifications have been laid down, but shown on drawings or added in future, shall be done in a workmanlike manner according to the pertinent standards as per ASTM/BSS (where ASTM not available). The engineer may supplement such specification during the progress of work. All materials and processes used for such an item shall be subjected to standard testing and, if found below the pertinent ASTM/British (where ASTM not available) Standards, shall be removed from the site immediately at Contractor's expenses.

ITEM – 2 SUBSOIL INVESTIGATION

The Contractor shall be deemed to have acquainted himself with the subsoil conditions on site and his rates shall fully cover all the works involved for excavation, dewatering and other factors affecting the works.
Where directed by the Engineer the Contractor shall hire a soil specialist as a Sub-contractor to drill 2 Nos. bore holes at the proposed site in natural soil 40 feet deep and at least 4 No. test pits, including mobilizing/demobilizing, carrying out standard penetration test at 3 ft intervals, collection, Grain size Analysis, Specific gravity, Bulk density, Unconfined Compression Direct Shear, Consolidation, Sulphate content & PH of Soil, Total Soluble salts & chlorides, compaction modified AASHTO and soaked CBR, all complete including submission of soil report etc. as per instruction/direction of the Engineer.

2.1 MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made for above section. All costs and charges shall be deemed to have been included in the rates for related items of works.

ITEM - 3 CLEARING, GRUBBING & DISPOSAL

3.1 SCOPE OF WORK

The work covered by this section of Specifications consists of furnishing all labour, materials, necessary equipment, services, miscellaneous and necessary items required to satisfactorily complete the clearing, grubbing and setting out of the Works, as indicated on Drawings, specified herein or both, until and unless directed otherwise by the Engineer.

3.2 CLEARING

Clearing shall consist in the felling and cutting up, or trimming of trees if any and the satisfactory disposal of tree and other vegetation designated for removal, together with the down timber, snags, bushes, and rubbish occurring within the areas to be cleared. Trees, other vegetation, stumps, roots, and bushes in areas to be cleared shall be cut-off below the original ground to extract the roots except such individual trees, groups of trees and vegetation as may be indicated on the drawings or designated by the Engineer to be left standing. Individual trees, groups of trees, and other vegetation, to be standing, shall be thoroughly protected from damage incident to construction operations, by the erection of barriers or by such other means as the circumstances required, and as approved by the Engineer. Clearing operation shall be conducted so as not to cause any damage or harm to existing structures and installations and to those under construction, and so as to provide for the safety of employees and others.

CHIEF ENGINEER
K.P.T

3.3 **GRUBBING**

Grubbing shall consist of the removal and disposal of all occurring stumps, roots larger than 1” in diameter, and matted roots in the designated grubbing areas, stumps, roots, logs or other timber more than 1 1/2" in diameter, matted roots and other debris, shall be excavated and removed to a depth not less than 18” below any subgrade, shoulder or slope. In areas where the cut is over 1m, grubbing shall not be necessary. In areas to be paved, or in areas indicated on the drawings as future paved areas, excess excavation from grading operations in places, or in areas designated by the Engineer as future paved areas where excess excavation from grading operations is placed, grubbing will be necessary.

3.4 **DISPOSAL**

Unless directed otherwise, timber and other refuse shall be disposed off by burning at locations approved by the Engineer in a manner that will avoid all hazards such as damage to existing structures, construction in progress, trees and vegetations. The Contractor shall be responsible for compliance with all pertinent laws and regulations pertaining to the burning of fires and observance of any security regulations applicable thereto, including environmental laws under specific ordinance or rules.

Disposal by burning shall be kept under constant attendance until the fires have burned out or have been extinguished. No materials will be permitted to be pushed or placed on adjacent property without prior written approval of the owner of such property.

3.5 MEASUREMENT AND PAYMENT

No separate measurement or payment shall be made for above section. All costs and charges shall be deemed to have been included in the rates for related items of works.

ITEM – 4 **SETTING OUT OF WORKS/DRAINAGE**

4.1 **SETTING OUT OF WORKS**

The Contractor shall set out the Works and shall be responsible for true and perfect levels and setting out of the same and for correctness of the direction, levels, dimensions, and alignments of all parts thereof. If any error in this respect shall appear during the progress of the work, the Contractor shall at his own expense rectify such error to the satisfaction of the Engineer. Any checking by the Engineer shall not relieve the contractor from his complete unshared responsibility for correct setting out of works. The Contractor shall construct and maintain accurate bench marks so that the lines and levels could be easily checked by the Engineer.

4.2 **DRAINAGE DITCHES/DEWATERING**

The Contractor shall construct and maintain such ditches/drains, in addition to those shown on drawings or as may be ordered by the Engineer to adequately drain the areas under construction of the water from any source including sub-soil water in foundations. If due to any negligence the area is flooded the same shall be drained with adequate measures by the contractor at his own cost.

4.3 **MEASUREMENT AND PAYMENTS**

No direct payment for the above item will be made and will be treated as incidental to other items of work.

ITEM - 5 EXCAVATION, FILLING, BACKFILLING & DISPOSAL

5.1 **SCOPE OF WORK**

The work covered by this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials & in performing all operations in connection with excavating, dewatering, filling, backfilling and disposal for all construction works and other foundations complete in strict accordance with this section of the specifications and the applicable drawings and subject to the terms and conditions of the Contract, notwithstanding any caving in of the trenches or filling in, etc.

CHIEF ENGINEER
K.P.T

5.2 **SUB-SOIL CONDITIONS**

The Contractor shall be deemed to have acquainted himself, with the sub-soil conditions on site and his bid shall be fully covering the work involved.
The Contractor shall make his own deductions for sub-surface conditions which may affect methods or cost of constructions of the work and he shall make no claim whatsoever for damages or compensation, should he find conditions during the progress of the work, different from those as calculated and/or anticipated by him.

5.3 **EXCAVATION**

Excavation shall include the removal of all material of every name and nature. If rock is encountered it should be removed carefully and without excessive noise and vibration. Blasting shall only be undertaken with the permission of Engineer. In case the Engineer does not allow blasting it will not be a ground for extra rates or any payment in such a case to the Contractor.
The excavation shall conform to the dimensions and elevations as indicated on the drawings or as directed by the Engineer. Foundations on made up ground shall have to be taken down to natural bottom soil as per drawings, and direction and approval of the Engineer.

Excavation shall extend to a sufficient distance from wall and footings to allow for placing and removal of forms, installation of services and for inspection but the same shall not be paid separately in the event of any excavations being carried out wider or deeper than authorised, the same shall be filled in by the Contractor at his own cost to the required levels with lean concrete (1:4:8 mix) if below footing or beneath the slabs and with properly compacted well graded sand free from any deleterious matter as directed by the Engineer, if the excavation is wider than authorised.

In case any excavation is carried out and after the levels have been checked by the Engineer, the pits and trenches, thereafter, are filled with accumulated sand or debris from blowing windstorm, duststorms, moving sand dunes or by any other reasons thereof, the excavation or levelling shall have to be carried out again in the same manner as before unless and until concreting is done in the foundation/trenches. No separate payment shall be made on any such account.

Shoring and Bracing

The Contractor shall provide at his own cost, where required, all shoring, wall supports etc. to the sides of the excavation to prevent sliding or any movement. Where necessary, excavated sides shall be sloped as directed by the Engineer with no extra cost to the Employer.

.

Dewatering and Drainage

The Contractor shall control at his own cost all the grading in the vicinity of site of work in order to prevent any water from running into the excavated areas.
He shall at his own cost keep drop dry all pits and trenches during construction and all dewatering and pumping out whether due to ground water seepage or otherwise shall be included in the bid price. The method employed in all cases shall be approved and agreed by the Engineer.

Protection of Utility Lines

When any existing utility line, whether to be retained or to be removed, are encountered within the area of operation the Contractor shall notify the Employer/Engineer and shall not proceed until necessary measures are taken for protection or removal of the lines and instructions are obtained from the Engineer/Employer. This will be done at no extra cost to the Employer.

5.4 **FILL AND BACKFILL**

Where concrete slabs, floors and pavements are to be placed on the ground any and all loam, organic and other unsuitable material shall be removed.
Fill where required to raise the subgrade for concrete slabs shall be clean, unadulterated, free from deleterious and organic substance and shall be free from wood, stones and other debris. In case sand shall be provided for filling, the same shall be clean and free from harmful substances.

All materials, where used in fill shall be compacted upto 95% modified AASHTO Density by power roller, mechanical rammer, or other approved equipment, in layers not more than 150 mm thick. In sand filling each layer shall be uniformly spread, saturated with water or dried and then compacted. Contractor shall arrange at his own cost the testing of the compaction.

CHIEF ENGINEER
K.P.T

After completion of foundation, footings, walls, slabs and other construction below the elevation of the final grades and prior to backfilling, forms shall be removed and excavation shall be cleaned of trash and debris. No backfilling shall be done until the entire foundations and footings etc. have been cured, inspected and approved by the Engineer. Backfill shall be placed in horizontal layers not more than 150 mm thick and shall have a proper moisture content for the required degree of compaction upto 95%. Each layer shall be compacted by mechanical tampers or by other suitable equipment approved by the Engineer. Backfill shall be brought to a suitable elevation above grade to provide for anticipated settlement and shrinkage thereof.
Backfill shall not be placed against foundation walls etc. prior to the damp proofing treatment if specified elsewhere in these documents or ordered later and after approval by the Engineer. Backfills shall be brought up evenly on each side of structures as far as practicable. Heavy equipment for spreading and compacting backfill shall not be operated closer to the structures less than distance equal to the height of the backfill above the top of footing.
The filling material shall be subject to the approval of the Engineer.

5.5 **COMPACTION**

Fill and/or backfill within the building or wherever required within the premises shall be compacted to a density of not less than 95% of the maximum density at optimum moisture content.

5.6 **ROUGH GRADING**

Necessary rough grading shall be carried out by the Contractor to establish the finish grade or construction requirements of the site, grades not otherwise indicated shall be uniform levels or slopes between points on existing and finished grades. Abrupt changes in slopes shall be rounded. Additional fill required to complete rough grading shall be provided as directed by the Engineer.
Where paving or slabs are specified, all rough grading shall be done to the sub-grade of the base course, removing all large stones and debris and shall be compacted uniformly to the correct lines and levels ready to receive the paving or slab. Refilling, where required shall be executed with suitable selected materials in layers not exceeding 150 mm in thickness and thoroughly compacted to the required density.

5.7 **MEASUREMENT AND PAYMENT**

Accepted quantities measured shall be paid at the contract unit price of net volume of excavation including backfill for the items listed below, and shown in bill of quantities which price and payment will constitute full compensation for all cost involved in proper completion of work.

ITEM - 6 PLAIN AND REINFORCED CONCRETE

6.1 **SCOPE OF WORK**

The work covered by this section of the Specifications consists of furnishing all materials, formwork, plant, labour, equipment, appliances and in performing all operations in connection with plain and/or reinforced concrete work whether cast-in-situ or precast, complete in strict accordance with the applicable Drawings, and the Specifications and descriptions in Bills of quantities of the contract and as approved by the Engineer. Adequate arrangements and skilled manpower shall be provided to produce homogenous concrete without honeycomb and to correct levels, grades, alignment and plumb. Until and unless specified or directed otherwise by the Engineer all materials and workmanship shall be based on the latest versions of applicable ASTM Standard. Any defective work shall be removed and reconstructed without undue delay to the approval of the Engineer. Any previous checks by the Engineer shall not in any way relieve the Contractor of his responsibility in respect of quality and accuracy of work.

Full care shall be taken to install embedded items, and form ducts and openings etc. Embedded items shall have been inspected and check tests for concrete and other materials or for mechanical operations shall have been completed and approved before concrete is placed. The Contractor shall submit and shall be solely responsible for the accuracy of the bar bending schedules of reinforcement to be approved by the Engineer for guidance only prior to the cutting of reinforcement. All concrete work including reinforcement etc. shall be carried out in accordance with the applicable requirements of ACI-318-89 and the instructions of the Engineer.

CHIEF ENGINEER
K.P.T

Prior to the commencement of work on the Site, the Contractor shall prepare, for approval by the Engineer, a plan showing the proposed locations of the aggregate and sand stock piles, cement storage area, steel yard, shuttering yard, batching and mixing plant etc., and a schedule of equipment to be used for mixing, transporting and placing of the concrete. He shall also detail all sources of materials that he intends to incorporate in, and use for, the making of concrete, which sources shall be similarly, subject to the Engineer's approval.

6.2 **MATERIALS**

Cement

Grey portland cement shall be normal setting cement of approved make and source and of the specific gravity fineness and chemical composition fully conforming to British Standard Specifications B.S. No.12 and shall be capable of satisfying all tests such as the tensile strength tests contained therein. Standard test briquettes prepared with 1:3 cement-sand mortar shall give the following tensile strength:

At 3 days not less than 21 kg/sq.cm (2.1 N/sq.mm)

At 7 days not less than 28 kg/sq.mm (2.8 N/sq.mm)

Sulphate resistant cement where required shall be sulphate resistant portland cement of approved make fully conforming to British Standard Specification No. 4027 and satisfying the requirements for fineness, chemical composition, strength, setting time soundness, etc.

The supply of cement must be so programmed by the Contractor such that at no time the quantity of cement stock shall be less than that required for an average consumption of four weeks. Lorry or truck or other means of transportation, for the conveyance of cement to the site of work, shall be clean, dry, metal-lined and covered from top with water proof sheets, so that cement is sufficiently protected from any deterioration during transit.

The Contractor shall provide at his own cost on the site all necessary sheds which shall be perfectly dry and water tight for the storage of cement to be delivered to the work, to ensure adequate supplies being available for the work.

If any time the Engineer considers that any batch of cement may have deteriorated on site during storage for any reason, he will direct that tests shall be made and the batch of cement on the site which may be in question shall not be used until it has been shown by test at a laboratory, approved or appointed by the Engineer to be satisfactory. Contractor shall bear all costs of such testing. Any rejected cement shall be removed from the site by the Contractor without delay. Cement reclaimed from cleaning bags or leaking containers shall not be used.

Cement shall be consumed in the sequence of receipt of shipments unless otherwise directed by the Engineer.

Aggregates

All fine and coarse aggregates to be used shall be supplied from approved sources which shall not be changed without permission in writing from the Engineer. Aggregate shall conform to the requirements of applicable ASTM C-33-82.

Fine Aggregate

Fine aggregates, shall be from an approved source of supply of a uniform quality conforming to ASTM C-33-82 and shall be clean and sharp and free from clay, earth vegetable and organic matters, alkaline or acid reactions or other deleterious salts or such harmful matters ad impurities and shall have dry specific gravity not less than 2.6 and %age absorption not greater than 2%.

Fine aggregates shall conform to the requirements of the relevant ASTM C-33-82 Specifications, and shall be graded as follows:

Sieve Number/Size	%age (by weight) passing
9.50 mm (3/8")	100
4.75 mm (No.4) 3/16"	95 - 100
2.36 mm (No.8) 3/32"	80 - 100
1.18 mm (No.16)3/64"	50 - 85
1.18 mm (No.30)	25 - 60
0.30 mm (No.50)	10 - 30
0.15 mm (No.100)	2 - 10

Fineness modulus of fine aggregate (sand) shall be not less than 2.3 and not more than 3.1.

CHIEF ENGINEER
K.P.T

Limits for deleterious substances of total sample shall be:

- Clay lumps and friable particles — Maximum 3.0% by weight
- Material passing No.200 sieve — Maximum 3.0% by weight
- Coal and lignite — Maximum 0.5% by weight

Weight loss of sand subjected to 5 cycles of soundness test when sodium sulphate is used shall not be greater than 10%.

Coarse Aggregate

Coarse aggregate shall be approved hard crushed stone from a source approved by the Engineer and shall be clean insert, hard, non-porous and free from laminated particles, sand, dust, salt, lime, chalk, clay organic impurities or other deleterious matter and shall have dry specific gravity not less than 2.6 and %age absorption not more than 2%.

Coarse aggregate shall also conform to gradation the requirements of ASTM C-33 and shall be graded as follows:

(Nominal Size of Graded Aggregates shall be 19mm down)

Sieve Number/Size	**%age (by weight) passing**
19.00 mm	90 - 100
12.50 mm	-
9.50 mm	20 - 55
4.75 mm	0 - 10
2.36 mm	0 - 5

Weight loss of coarse aggregate when subjected to 5 cycles of soundness test using sodium sulphate shall not exceed 12% and %age loss for Los Angles Abrasion (500 revolutions) not greater than 50.

All aggregates shall be stored on properly constructed paving and in bins and there shall be a physical partition between the stock piles of coarse and fine aggregates. No mixed up aggregates shall be used in any concrete Under no circumstances aggregates shall be allowed to be in contact with ground.

Aggregates shall be screened and washed if required, to the satisfaction of the Engineer, before use by proper screening and washing plant. Adequate time is to be allowed, therefore, for the moisture content to become substantially uniform before use in works.

Water

Water to be used in the work shall be potable water and shall be free from all impurities whether suspended or dissolved. Further, the water shall not contain any chemical impurities, salts etc. of any kind. Water shall be tested for its fitness in works in accordance with AASHTO Method T26-5.

6.3 **CLASSIFICATION OF CONCRETE**

Classes of concrete to be used in various parts of the works shall be as indicated on the drawings and mentioned in the bill of quantities. The concrete of various grades shall be proportioned as set out in Table-1 below:

TABLE – 4

Type of Concrete	Max. Size of coarse aggregate	28 day compressive strength (cylinders)		Minimum Nos. of Cement Bags/100/Cft	Consistency (Range in Slump inches
		Laboratory	Field Cured		
		Kg/cm^2 (psi)	Kg/cm^2 (psi)		
Class A	21	330 (4680)	210 (3000)	24	2-3
Class B	20	204 (2900)	170 (2400)	17	2-3
Lean Concrete	51	120 (1700)	100 (1400)	13	-

CHIEF ENGINEER
K.P.T

6.4 **PROPORTIONING OF CONCRETE MIXES**

All concrete shall be proportioned by weight for design of concrete mixes, unless specifically agreed by the Engineer to proportion them by volume, which permission shall be given only if the arrangements made at site are satisfactory. The Contractor shall submit to the Engineer proposed mix designs for concrete to be used, based on preliminary laboratory test to determine proportion of cement, aggregates and water in the concrete conforming to the quality and strength requirements specified herein. Quantity of cement so arrived at shall be increased but not decreased from the minimum quantity of cement stated in Table-1 above. Preliminary test results of at least three different mixes of each class of concrete with varied water-cement ratios shall be submitted. The results of 7 days and 28 days cylinders tests shall be used to establish the ratio between 7 days and 28 days strengths of used concrete. The Engineer may order adjustments in the ratio of fine to coarse aggregate in the mix for a certain work which shall be done without additional cost. Preliminary design of mixes and testing shall be the responsibility of the Contractor at his own cost. The proportion of voids in the coarse aggregate shall be controlled and if it exceeds 45%, sand and consequently the cement shall be increased by the Contractor without any charge. If the proportion is less than 45%, sand shall be decreased but not the cement.

Maximum Allowable Water Content

All concrete specimens shall be made, cured and tested in accordance with ASTM Standard. A curve representing the relation between the water content and the average 28 days compressive strength or earlier strength at which the concrete is to receive its full working loading shall be established for a range of values including all the compressive strengths shown in the Drawings or in BOQ. The curve shall be established by at least four points, each point representing average values for at least four points, each point representing average values content for atleast four specimens. The maximum allowable water content for the concrete shall be as determined from this curve and shall correspond to a strength 15% greater than that required. However water cement ratio of 0.50 shall not be exceeded.

Slump Test

The slump for concrete, determined in accordance with ASTM C-143 Test for Concrete, shall be minimum of 25 mm and a maximum of 75 mm (normally 50 mm to be adopted) provided the requisite strength is obtained. Corrective additions to remedy deficiencies in aggregate gradations shall be used only with the written approval of the Engineer. When such additions are permitted, the material shall be measured separately for each batch of concrete.

6.5 **MIXING WITH CONCRETE MIXERS (ELECTRIC/MECHANICAL OPERATED)**

No hand mixing under any circumstances even with extra cement shall be permitted. If during concreting, the mixing plant fails, the concrete already poured shall be removed, unless directed otherwise by the Engineer. Mixers which have been out of use for more than 30 minutes shall be thoroughly cleaned before any further concrete is mixed.

The capacity and number of mixers provided by the Contractor shall be such as to meet requirements but without producing an appreciable excess concrete at any time. Special attention shall be devoted to this point in hot weather when the setting of concrete is considerably accelerated.

The volume of the mixed material per batch shall not exceed the manufacturer's rated capacity of the mixer.

To ensure that the concrete materials can be mixed most readily into a homogeneous mass, wherever possible the cement, aggregates and water should be fed into the drum simultaneously.

Each batch of materials including water shall be mixed in the drum of the mixer until the concrete is of uniform colour and consistency. The minimum time of mixing shall be three minutes for drum mixers. The mixing time shall be measured from the time all materials required for the batch, including water, are in the drum of the mixer.

The drum shall be completely emptied before recharging and any water retained in the mixing drum be completely discharged.

The mixing water shall be regularly sampled and tested for salt content and contamination.

On completion of each working period, the drum of the mixer shall be thoroughly cleaned and all adhering concrete shall be removed.

Concrete shall be discharged from the mixers and conveyed to the work in such a manner that no segregation or leakage of the constituent materials takes place. The method and equipment used for transporting concrete shall be subjected to the approval of the Engineer. The means of transportation shall ensure that the concrete is of the required quality at the point and time of placing.

CHIEF ENGINEER
K.P.T

6.6 **TRANSPORTING AND PLACING CONCRETE**

Concrete shall be conveyed and deposited as quickly as possible after mixing and shall proceed so that, as far as possible, a complete section of the work is done in one operation. The concrete may be distributed in barrows, skips, chutes and by any other method such as pumps, conveyor belts etc. all to the approval of the Engineer.
Transport of concrete shall be in a manner approved by the Engineer and shall be so as to avoid segregation or loss of ingredients of concrete.

All foundations, superstructure and roofs and other portions of work to be concreted shall be approved by the Engineer in writing before concrete is poured. For this purpose a standard format shall be provided by the Engineer (called Pour Slip).

All forms and reinforcement shall be completed, cleaned, to be inspected and approved before pouring of concrete. No concrete is to be deposited till the Engineer has inspected and approved in writing all aggregates, cement, reinforcement, forms, details, positioning of all fixture and materials to be embedded in concrete, control levels and screeds, etc. and is satisfied with the arrangements the Contractor has made to efficiently proceed with the work such as sufficient labour, materials, plants etc. Such an approval will not relieve the Contractor from any of his obligations under the Contract. No concrete shall be deposited without the written permission from the Engineer (Pour slip to be signed) who shall have no authority to waive off this condition. Any concrete without such written authorization shall be liable to be rejected.

Placing of concrete shall not be permitted when, in the opinion of the Engineer the sun, heat, wind, cold, snow, or limitations or facilities furnished by the Contractor prevent proper preparation, placing, finishing and curing of concrete.

All concrete shall be thoroughly compacted and consolidated by means of pneumatic or mechanical immersion type vibrators of suitable size having minimum frequency of 8000 RPM. Care shall be taken to avoid segregation due to excessive vibration. The Contactor shall maintain on site at all times one or more standby vibrators. Tapping or other external vibration of forms shall not be allowed, unless so directed by the Engineer in that case form work shall be adequate to withstand vibrations. Compaction shall be done until the whole mass assumes a jelly like appearance and consistency with water just appearing on the surface. Concrete shall be sufficiently tamped and consolidated around the steel rods, care shall be taken that the vibrator does not touch steel or formwork, and is worked into all parts of the moulds in order that no voids or cavities are left. Steel shall not be disturbed during operation of concreting. Concrete shall be brought up in even layers not more than 200 mm thickness and worked against side of forms to give a smooth and uniform surface. No surplus water shall be allowed to come out and lie on the surface of concrete. The concrete must be of such a consistency that after ramming, consolidating and tamping is completed, a thin film of water is just appearing on the surface. In vibrating, care shall be taken to avoid displacing the reinforcement.

Hardened concrete, debris and foreign materials shall be removed from interior of forms and form inner surface of mixing and conveying equipments.

Runways and gangways shall be provided for wheeled concrete handling equipment and workmen, and such equipment shall not be wheeled over reinforcement, nor shall runways be supported on reinforcement.

Concrete shall not be dropped freely from a height of more than 3 metres. In cases where an excessive drop is inevitable the Contractor shall provide spouts, down pipes, chutes, or side ports to forms with pockets which will let concrete stop and flow easily into the form without any risk of segregation. The discharge of the spouts, down pipes or chutes shall be controlled so that the concrete may be effectively compacted into horizontal layers not more than 200 mm thick.

Concrete is to be deposited as quickly as possible after mixing and to proceed continuously. Concrete which has attained its initial set or has contained its mixing water for more than 30 minutes shall not be allowed to be placed in the work.

When concrete is laid on hard core, such as subgrade for floor slabs, or other absorbent material, the surface is to be watered, consolidated and, blinded before the concrete is deposited.

CHIEF ENGINEER
K.P.T

Fresh concrete shall not be placed on previously laid concrete or on old concrete surfaces until the latter has been cleaned of all dirt, scum and laitence by wire brushes. The clean surface shall then be thoroughly wetted and grouted with cement slurry as approved by the Engineer.

Care shall be taken not to disturb newly placed concrete by vibrator, indirect loading or otherwise. No traffic or loading shall be allowed on the concrete until it has thoroughly set and hardened.

Construction joints in concrete shall only be given at locations indicated on the drawings or as approved by the Engineer. If approved by the Engineer, the concrete at the end of the day's work shall be finished off against a temporary shutter stop which shall be vertical and securely fixed. Such stops shall be removed within 24 hours of placing of concrete. Construction joints not shown on the drawings shall be reinforced with steel bars or dowels if deemed necessary by the Engineer and to be furnished by the Contractor without any additional payment.

No concrete shall be placed during rains or inclement weather and all fresh concrete shall be suitably protected from rain fall and excessive heat or cold.

Should any part of the exposed surface present a rough, uneven or imperfect appearance, when the shuttering is removed, it shall be picked out to such depth and refilled and properly re-surfaced and entirely redone, at the cost of the Contractor, as per directions and approval of the Engineer.

On removal of the forms and before the concrete skin has had time to harden all faces of the concrete inside and outside, to be kept exposed (i.e. unplastered) shall be rubbed over with carborundum stone, and washed with cement to remove all marks, projections, hollows, or any other defect. No extra payment shall be made for this work.

All exposed surfaces and lines of the concrete work are to be true and fair without cracks, bends, windings and distortions of all kinds, without any extra charges by the Contractor. All concrete work to remain exposed and unplastered is to be fair face smooth, pleasing in appearance and to the entire satisfaction of the Engineer.

A float or screed is to be worked over the exposed surfaces of all concrete work on the flat or curve, so as to render the surfaces perfectly smooth, clear and to the necessary slopes or falls or as required to receive the floor or roof finishes according to the drawings and as directed by the Engineer without any extra charge by the Contractor.

6.7 **PROTECTION AND CURING**

All exposed concrete shall be cured. Curing shall be accomplished by preventing loss of moisture, rapid temperature change and mechanical injury from rain or flowing water for a period of at least twenty eight (28) days. Curing shall be started as soon as the concrete has hardened sufficiently for the surface not to be marked. Curing shall be done either by continuous sprinkling of water on the surface or by covering with sand, hessian, canvas or other approved fabric mats which shall be kept continually wet and shall be continued at least for a period of fourteen (14) days with watering atleast thrice a day in the next fourteen (14) days. If required and so directed by the Engineer, formed surface with forms in position shall also be cured by keeping all forms continually wet. As an alternative, curing of concrete on all exposed surfaces which could not be kept covered, such as sides of the beams, under side of the slabs, may also be done by sealing concrete surfaces with liquid membrane forming curing compounds white pigment type conforming to ASTM C-309 or equal so as to arrest loss of moisture from concrete, with the approval of the Engineer. Care should be taken so as to spray the compound/chemicals on all the exposed faces of concrete so that no loss of moisture takes place. The Contractor shall take special care that curing of concrete is satisfactorily carried out and in accordance with methods specified herein and /or as instructed by the Engineer.
Any negligence in this regard may result in total rejection of such concrete works which in the

opinion of the Engineer have not been adequately cured. Period of curing for any concrete shall be as stated above or as directed by the Engineer. All concrete pours and concreted structures shall be clearly marked with non-washable paints to indicate the date of placing concrete. During hot weather, curing shall be done even at night. It shall be obligatory on the part of the Contractor to obtain a certificate from the Engineer that the curing has been properly done. A suitable format shall be printed and kept on site to be signed by the Engineer for every part of the work.

CHIEF ENGINEER
K.P.T

6.8 **SAMPLE AND TESTING**

Testing of Concrete

All test cylinders shall be of 150 mm dia x 300 mm long size cast in steel moulds. Set of 6 cylinders shall be prepared numbered and initialed by Engineer each for foundations, plinth, band, columns, door level band and roof.

Three cylinders of the set shall be tested at 7 days and shall be tested at 28 days.

All test specimens shall be made, cured & tested in accordance with ASTM or applicable British standard.

If the strength tests of the specimens for any portion of the work falls below the minimum required compressive strength at 28 days for the class of concrete used in the portion, the Engineer shall have the right to order dismantling & replacement of the affected work.

Water
Water to be used in the work shall be potable water.

Cement
Cement shall be tested as prescribed in BS-12.

Aggregate
Aggregates shall be tested as prescribed in ASTM C-33. In addition, fine aggregates shall be tested for organic impurities in conformity with ASTM C-40.

Reinforcement
Reinforcement bars shall be tested as prescribed in BS-4461 (for Ribbed Tor Steel), ASTM A-615-82(S1) (for Mild Steel Plain Bars). Refer Item 6.12 of this Section for minimum yield strength and other requirements.

6.9 **PRECAST CONCRETE UNITS**

Precast concrete units shall be cast to the sizes and dimensions as indicated on the drawings. Separate precasting platform of the size and at the location approved by the Engineer shall be made. All the concrete used for precast units shall conform to the specifications laid down for cast in situ reinforced concrete unless otherwise required. Special vibrating tables shall be employed for thin sections.
All concrete for precast units shall be cast against formica lined formwork to finish smoothly to the required lines, angles and all the units shall be adequately cured in water tanks and shall be properly stacked on the platform to prevent damage or cracks. All precast units shall be transported and erected into position in the manner as approve by the Engineer.

6.10 **WATERPROOF CONCRETE**

Wherever specified on the drawings and all liquid or water retaining structures and those subject to water pressure shall be executed with approved waterproofing compound such as PUDLO or approved equivalent. The waterproofing compound shall be mixed with the concrete in strict accordance with the manufacturer's directions and/or as directed by the Engineer.
Special care will be observed to make the shuttering waterproof. The shuttering joint shall be well made to make them leakproof. Tin strips to join the shuttering planks will not be used as they result in leakage. New timber or plywood shuttering shall be used for work under this section.

.11 **REINFORCEMENT STEEL**

General
The work covered by this sub-section of the Specifications consists of furnishing all materials, tools, labours and in performing all operations in connection with the providing, straightening, cutting, bending, fixing, binding including binding wire, chairs, pins, spacer blocks complete in strict accordance with this sub-section of the Specifications, the applicable drawings and approved bar bending schedule.

CHIEF ENGINEER
K.P.T

Materials

Reinforcing steel to be new billet stock of mild steel (plain bar) and ribbed to steel bar as specified hereunder and on the drawings and shall conform to relevant British Standard Specifications for Ribbed Tor Steel and ASTM for Mild Steel. It should be free from loose mill scale, loose rust, oil, grease, dirt or other harmful substance.

The Contractor shall furnish from the agency supplying the steel, the manufacturer's mills certificates to guarantee that supplied steel is from new billets and the steel meets all the requirements of the relevant specifications and further meets the minimum certified requirements as follows:

i) Mild steel plain and deformed bars grade 40 conforming to ASTM 615-82 (S).

a)	Minimum Ultimate tensile strength	4,922 kg/sq.cm
b)	Minimum Yield Strength	2,812 kg/sq.cm
c)	Minimum Elongation	8% to 12%

ii) High yield steel bars: These are Ribbed tor steel conforming to BS 4461-1978.

a)	Minimum Ultimate tensile strength	upto 16 mm 5,104 kg/sq.cm
		over 16 mm 4,781 kg/sq.cm
b)	Minimum Yield strength	upto 16 mm 4,711 kg/sq.cm
		over 16 mm 4,360 kg/sq.cm
c)	Minimum Elongation	upto 16 mm 12%
		over 16 mm 14%

Bendability

All Mild Steel bars shall be capable of being bent cold through 180 degree round a bar of two times its own dia without fracture or injury of any kind.

All Tor Steel bars shall be capable of being bent cold through 180 degree round a bar of two times its own dia without fracture or injury of any kind.

18 gauge galvanized wire shall be used for binding the steel reinforcement.

Samples shall be tested for above requirements in an approved laboratory before starting the cutting of the bars and when so required by the Engineer; and all cost of such tests shall be borne by the Contractor.

Storage

Reinforcing bars shall be stored on platform sufficiently above ground surface and be free from scales, oil, structural defects prior to placement in works. Rusted or dirty steel bars shall not be used in the works unless brushed and cleaned by proper steel wire brushes and after being approved for use by the Engineer.

Reinforcement Cutting and Placing

All reinforcement steel shall be cut and bent cold in strict accordance with the drawings and bar bending schedules approved by the Engineer. In case any bars, cut, bent or even fixed in position are found incorrect in dimensions, size, and shape and are not according to the requirements of the drawings or instructions of the Engineer, notwithstanding any previous approval of the Engineer, the Contractor shall replace such steel bars, cut, bent or fixed in position, by correct sizes bars at his own cost and no extra payment shall be made to the Contractor on such account. Suitable spacers, chairs as approved by the Engineer shall be used for supporting and spacing purposes of bars. In case any bars are bent or displaced they shall be straightened or replaced prior to pouring. All reinforcement bars within the limit of a days pour

shall be in place and firmly tied with 18 gauge G.I. wires. Bars with kinks or bends not shown on the drawings shall not be used. Reinforcement bars shall not be used for supporting the workman and concreting work. Separate supporting system shall be used for this purpose.

Laps and Splices

No. splicing of bars shall be allowed at position other than shown on the drawings. All lap lengths shall be of the minimum sizes as indicated on the drawings and in no case shall lap length be less than 40 times the diameter of bigger bar in tension and 35 times the diameter of bigger bar in compression for nominal M.S. bars. High yield (tor steel) bars shall have laps of 50 times the bigger diameter of lapping bars in tension and 40 times for compression. Splices of adjacent bars shall be staggered, unless approved otherwise by the Engineer. All reinforcing steel fixed in position shall be inspected by the Engineer and no concrete shall be poured until steel placement has been approved in writing by the Engineer. For inspection purposes the Contractor shall give to

CHIEF ENGINEER
K.P.T

the Engineer reasonable notice before the scheduled pouring time. Clear concrete cover to reinforcement steel shall be as specified or indicated on the drawings or as directed by the Engineer.

6.12 **FORMWORK**

General

The Contractor shall provide all materials and labour, necessary for a good and speedy making and erection of form work such as scaffolding, shuttering, planks, struts, bolts, stays, gangways, boards, fillets etc. and shall do all that is essential in executing the job in a workman like manner to the satisfaction of the Engineer.

The formwork for columns, beams, slabs, walls and all other works whether to be precast or cast-in-situ shall conform to ACI-347 and shall be made of sound and properly seasoned timber or other approved material and shall be rigidly formed and designed by the Contractor to the required shapes and forms, so as to be able to withstand, without displacement, deflection or deformation or movements of any kind, the pressure of the moist concrete and all other loads.

Contractor shall remain solely responsible for any damage or injury caused to the work and people, due to improper formwork resulting in dislocation or collapse when loaded or early striking of formwork.

Materials

Forms

Forms shall be constructed of wood or metal, and shall conform to ACI 347.

Form Oil

Form oil shall be non-staining colorless mineral oil, free from kerosene; the flash point shall be not lower than 149 degrees C, determined in accordance with ASTM D92.

Form Sealer

Shall be best of its kind and shall be as approved by the Engineer.

Form Accessories

Form ties, anchors and hangers shall be of sufficient strength to completely resist displacement of forms due to construction loads and the depositing of concrete. Provide tie and spreader type form ties designed to that no metal will be within 25 millimeters of any surface when forms are removed. Where concrete surfaces are exposed to view, do not use form ties which, when removed, will leave a depression larger than 25 millimeters in diameter. Use water seal ties in concrete exposed to hydrostatic pressure. Conform to ACI 301 and 347.

Design of Formwork

All formwork and supports thereto shall be designed by the Contractor for the type and quantum of loads and forces to be supported and relevant drawings shall be submitted, if so directed, to the Engineer for approval before the work is taken in hand. Such an approval shall not relieve the Contractor from all or any of his obligations under the contract.

Formwork: Fabrication and Erection

Forms shall be fabricated and erected in position, perfect in alignment, levels and true to plumb and shape and securely braced so as to enable it to stand all weights, dead and live, to be endured during placing of concrete and its subsequent hardening till the form work is struck. It shall be sufficiently rigid as not to loose its shape and shall be made to compensate for bulging, and deflection to give the finished concrete the required lines, plumb, size and shape.

The form work shall be so designed and arranged as not to unduly interfere with concrete during its placing, and easy to be removed without injuring the finished concrete. Wedges, clamps, bolts and rods shall be used, when permitted and where practicable, in making the form work rigid and in holding it to true position.

The joints in the form work for all concrete surfaces shall be close jointed and treated smooth so as not to allow any leakage of mortar form the concrete and show any appearance of leaking mortar on concrete surface.

Formwork for Fairfaced Concrete

CHIEF ENGINEER
K.P.T

In addition to the provision made elsewhere, for all the concrete work covered in this contract which are to remain exposed in the finished work and left unplastered, the formwork shall be smoothly faced by using plywood sheets or lining the shuttering with smooth G.I. sheet or non-absorbent material like formica sheets or in any manner as approved by the Engineer so as to make a perfectly smooth surface of the finished concrete.

Temporary Openings in Formwork

Wherever concreting is required to be carried out within forms of depth exceeding 2 metres, temporary openings in the side of the form shall be provided to facilitate the pouring and consolidation of the concrete. Small temporary openings may be provided at the bottom of all forms to permit the removal of rubbish etc; but the same shall be suitably closed before pouring of concrete.

Openings and Other Details

Provision shall be kept in the form work such as openings, recesses, holes, pockets,fillets, etc. for housing services and other details in the finished concrete or on its surface and edges as shown on the drawings or as directed by the Engineer and to fix all necessary inserts, dowels, pipes, holdfast etc. in concrete as shown on the drawings or as directed.

Treatment and Inspection of Forms

All rubbish particularly chippings, shavings and sawdust shall be removed from the interior of the forms, before placing concrete. Forms shall be coated with approved shuttering oil before reinforcement is placed. Surplus oil on forms and any oil on reinforcement steel shall be removed. If the forms are not used within 24 hours, a fresh coat of oil shall be given before placing of concrete if so directed by the Engineer.

Striking Shuttering

Forms shall be removed in such a way as to permit the concrete to take the stress uniformly and gradually. Any method of form removal likely to cause overstress of the concrete shall not be used.

No struts or timbering which serve the purpose of supporting the shuttering or centering shall be struck and removed without permission from the Engineer in writing and the work of striking and removal after the receipt of such permission shall be conducted under the personal supervision of the competent foreman in the employment of the Contractor; and the Contractor even after the permission from the Engineer shall hold himself fully responsible for any consequence whatsoever. In all cases the Engineer will direct and control the minimum period of time for which the forms, shuttering or centering the minimum period of time for which the forms, shuttering or centering shall remain in place before being struck; but, for the general guidance of the Contractor, the following are to be considered as the desired periods for the main classes of work:

Removal of Shuttering	Cold Weather	Normal Weather
	No. of days	No. of days
Beams sides, walls and Columns		
(unloaded)	4	2
Slabs soffits	18	14
Beams soffits	21	15

The Engineer may require, however, that any wallings, solders, struts or other timbers or supports, the removal of which may cause the transference of load to the finished work, to be kept in place for three weeks after the placing of the concrete.

The Contractor shall be responsible for any injury to the work and any consequential damages caused by or arising from the removal and striking of forms, centering and supports, due to striking too soon, and any advise, permission or approval given by the Engineer relative to the removal and striking of forms, centering and supports shall not relieve the Contractor from his responsibilities under the Contract.

CHIEF ENGINEER
K.P.T

Treatment after Removal of Forms

Any minor surface blemishes or other irregularities are to be properly made good immediately upon the removal of the form work and the surface made good to the satisfaction of the Engineer. Any small voids shall be neatly grouted with cement mortar consisting of one part of cement to two parts of sand and the whole surface rubbed over with carborundum stone and cement wash and bring the whole to a smooth and pleasing finish and uniform colour.

6.13 **CONSTRUCTION JOINTS**

Construction joints shall be located as indicated on the drawings and/or as approved or directed by the Engineer. For slab and beams, construction joints shall be located at mid point of the span unless a secondary beam intersects a main beam at the centre in which case the joints in the main beam shall be off-set a distance equal to thrice the width of the beam and provision for shear shall be made by the use of inclined reinforcement at the cost of the Contractor. Joints in columns shall be made at the under side of the deepest beam framing thereto. Beam stems and slabs shall be poured monolithically unless allowed otherwise by the Engineer in writing. Joints not specified or shown on the drawings if so required and approved by the Engineer, shall be so located as to least impair the strength and appearance of the work. Except and where indicated on the drawings, no jointing shall be made in footings or foundations without written approval of the Engineer. Construction joints shall be at right angles to the member and shall be formed against firm stop boards. The stop board shall be removed as soon as possible after placing the concrete but without the risk of movement of the concrete and the concrete surface shall be well brushed with a hard brush and washed off with a spray of water, two to four hours after castings, to expose the aggregate and provide a key for the next pour. In all liquid retaining structures and other sub-structure pits and trenches P.V.C, stopper sheets or any other approved water stops shall be provided at the construction joints in the manner shown on the drawings and/or approved by the Engineer.

Whenever a section of concrete is left unfinished, for any reasons with the prior approval of the Engineer, leaving surface which will be hard-set before additional concrete can be joined to it, additional measures such as dovetails, grooves or other bonds shall be provided as may be necessary to ensure a good bond with the new work, at the cost of the Contractor. Before depositing fresh concrete upon or against any concrete which is already set, the surface of the set concrete shall be roughened with a cutting tool, any laitance removed, thoroughly cleaned from all foreign matter, well watered and covered with approved bonding compound, and special care shall be taken to ram the fresh concrete thoroughly up and against the set concrete; and, if deemed necessary by the Engineer, the joints shall be reinforced with steel bars or dowels to be all furnished and done by the Contractor without any additional payment.

6.14 **ANCHOR BOLTS, INSERTS, SLEEVES, CHASES, RECESSES, STEEL FRAMES**

The Contractor shall furnish and place in position accurately, as shown on the drawings, all inserts, sleeves, chases, recesses, etc., supplied by himself or other sub-contractor or Contractors, as directed and full cooperation and coordination shall be maintained with other contractors, sub-contractors in this regard.

6.15 **MEASUREMENT AND PAYMENT**

Concrete

Payment shall be made for the net volume of Concrete as per drawings or as actually executed whichever is less (provided that the Engineer has agreed and allowed the reduction in sizes whenever occurred, which however shall not be a usual case).

Steel Reinforcement

Payment for steel reinforcement shall be made for the actual length of steel bars incorporated in the work multiplied by the standard weight without consideration of over-rolling etc. Wastage, laps not shown in drawings, spacer bars, chairs, binding wire etc. shall not be paid and the Contractor shall be deemed to have made provision for such matters in his rates for steel reinforcement in the Bill of Quantities.

CHIEF ENGINEER
K.P.T

Formwork and Construction Joints
No separate measurement or payment shall be made for Formwork and Construction Joints and all costs and charges shall be deemed to have been included in the rates for related items of concrete in the Bill of Quantities.

ITEM - 7 BLOCK MASONRY WORK

7.1 SCOPE

The work covered by this section of the Specifications consists of furnishing all plant, equipment, appliances, and materials, and in performing all the operations in connection with brick masonry work complete in strict accordance with the specifications herein and the applicable drawings and subject to the terms and conditions of the contract.

7.2 MATERIALS

Cement
The cement shall be normal setting portland cement of approved make complying all respects with BS-12.

Sand
Sand shall be sharp, cubical, hard, dense, durable and shall pass through 3/16 sieve and 2 to 10% through sieve No.100. It should free from organic impurities and lumps and salts of any nature and kind.

Water
Water shall be as specified under Item - 6 on page SPC-13 for Concrete and shall be free from salts of any nature and kind.

BLACKS
Bricks shall be hand moulded or machine made of the best kind conforming to relevant BS 3921 having a size not less than 220 mm x 105 mm x 67 mm. They shall be hard, sound, well burnt, regular in shape and colour, uniform in size, and free from nodules of lime. When the bricks are struck together they shall give a ringing sound.
Samples shall be approved by the Engineer at intervals and consignments rejected shall be immediately removed from the site. Colour of the bricks shall be as approved by the Engineer.

Minimum crushing strength shall be 85 kg/sq.cm. The bricks shall not absorb more than 15 percent water (of their dry weight) when immersed in water for 24 hours.

The finished brick work shall not show any sign of efflorescence as the same will pass through the plaster and spoil internal finish e.g. distemper, plastic paint.

7.3 CEMENT MORTAR FOR MASONRY

Mortar shall be composed of one part cement and four parts of sand or as described in the relevant B.O.Q. Mortar shall be machine mixed and hand mixing shall not be allowed in any case.

Mixing Time
Mortar shall be mixed in the mechanical mixer for 2 minutes. Mortar shall be used within half an hour of mixing. Mortar standing for more than half an hour shall not be used.
The ingredients for mortar shall be measured in boxes. No retempering of mortar shall be allowed nor mixing of any antifreezing ingredients in mortar shall be permitted.
The mortar shall be subject to compressive strength test and the average compression strength of three Nos. 50 mm cubes of mortar shall be not less than 126 kg per sq. cm (1800 psi) at 28 days.

7.4 MASONRY AND JOINTING

All bricks for laying in cement mortar directed by the Engineer shall be thoroughly soaked in water for 24 hours before use.
All masonry shall be laid in plumb, true to line and level in accurately spaced course with each breaking joints with the course below, corners and reveals shall be plumb and true, chases, grooves, reglet bricks and raked out joints shall be kept free from mortar and other debris.
The thickness and length of various walls shall be as indicated on the drawings.

CHIEF ENGINEER
K.P.T

Unless otherwise shown on the drawings or specified, the spaces around frames and other build-in-items shall be solidly filled with mortar except those joints which are to be caulked shall be raked out 20 mm deep.
Bricks for brick work which shall not be covered with plaster will remain exposed, shall be pre-selected and the face, or faces, of the brick which will remain exposed shall be ground smooth prior to installation to give a even, uniform and smooth texture. Samples of which will have to be approved by the Engineer.
Work required to be build in with masonry including anchors, wall plugs and accessories shall be build in as the work progresses. Wood plugs and blocking shall not be built into masonry.
All horizontal and vertical joints shall be completely and solidly filled with mortar as the bricks are laid.
The thickness of joints shall not exceed 10 mm and the joints shall be pressed 12 mm deep when the mortar is still fresh so as to provide for proper bond for the plaster and pointing.
No masonry to be erected when temperature of outside air is below 40 degree F, unless suitable means, as approved by the Engineer are provided to heat materials, protected from cold and frost and ensure that material will harden without freezing.
Where masonry work abuts columns, it shall be anchored there, by means of dovetail 10 mm dia M.S. bar at every 4th course of masonry unless otherwise directed by the Engineer.
The top course of partitions under slabs and beams shall not be laid until the forms have been removed and the roof slab placed.

All bricks to be thoroughly soaked in water before being laid in cement.
All joints to be well flushed up at every course. The walls shall be carried up regularly, not leaving any part more than 1 m lower than another, unless special circumstances render this impracticable and are so approved by the Engineer.
Any walls left at different levels to be racked back, courses to be properly levelled, perpends, quoins, jambs and other angles plumbed, as the work proceeds.
All brick work shall gauge four courses to 300 mm in height including four joints.
All brick work to be build in English Bond unless otherwise directed by the Engineer, no half bricks or bats being used except where necessary to complete the bond.
When the masonry is to receive plaster on one side and pointing on the other, the brick shall be placed in such a way that the better face shall be on the side of pointing.

7.5 **COORDINATION**

Provide chases, and openings required under other sections to sizes and location shown in the drawings.
Cooperate with other trades in setting build in items, take special care in cutting, fitting, setting units so that built in members are in their true, respective positions, flush voids full.

For items provided in other sections such as door frames, hold fasts, miscellaneous metal work occurring in the masonry, sleeves, anchors, supports, nailing strips, braces, jambs, are to be built-in the masonry.

Special care shall be taken in building walls of door frames, Contractor shall see that frames are square and in plumb. Check frames before building work around or against them. The Contractor shall see that full electric conduits are not housed into frames, so as to prevent extension of frame anchors.

The Contractor shall be responsible for any damage to his own work and also to the work of other sections.

7.6 **PROTECTION AND CLEANING**

Surface of masonry not being worked or shall be properly protected to all times during the construction operations. When rain and/or snow is expected and the work is discontinued.
Exposed masonry surfaces shall be cleaned with water and fibre brushes or as directed by the Engineer.

Protect adjacent work during cleaning operations, make good damage from neglect of this preaution.

CHIEF ENGINEER
K.P.T

7.7 **SAMPLES**

Samples of all kind of materials to be used on the job shall be submitted to the Engineer and to be approved by him before bulk quantities are procured. Source of supply or quality of materials not to be changed unless authorised in writing by the Engineer.

7.8 **TESTING**

All the materials and samples shall be subject to standard testing and if found below the recognized standard specifications such as BSS, ASTM or equal shall be rejected. Rejected materials shall be removed from the site immediately. All testing shall be done at contractor's cost.

7.9 **CURING**

Curing shall be done as specified in Item - 6.

7.10 **MEASUREMENT AND PAYMENT**

Masonry work below plinth shall be measured in cubic measure and above plinth measurement shall be made in square measure. Payment shall be made for the square measurement of walls area actually constructed. No separate measurement or payment shall be made for wall ties, or holding clips etc.

ITEM - 8 FLOORING

8.1 **SCOPE OF WORK**

The work covered under this section shall include furnishing of all materials, labour, equipment and appliances and performing all operations required in connection with flooring work as described hereinafter, shown on the drawings, stated in the description of items of work in the Bills of Quantities and as directed and approved by the Engineer.

8.2 **MATERIAL**

The material of fill shall be obtained from approved sources. Suitable material obtained from excavation shall also be used. Quality of fill material shall be governed by the relevant specifications.

Stone Soling (Hard core)

Course aggregates shall be crushed or uncrushed stone, angular or rounded in shape and shall have granular, crystalline or smooth surface free from friable, flaky and laminated pieces, mica and shale, all coarse aggregate shall conform to BSS 882. Aggregate shall be thoroughly rolled and compacted mechanically to achieve a compaction of 95% modified AASHTO.

Lean Concrete Sub-floor

Lean concrete sub-floor shall conform to the relevant specifications for Concrete.

Class-B Concrete Base

Class-B concrete base shall conform to the relevant specification for Concrete.

Ceramic Tiles

150mm x 150mm 200 x 300 size 1st quality Ceramic Tiles manufactured by M/s. "EMCO" Tiles Ltd or approved equivalent shall be used.

The relevant information regarding the quality, finish and origin as to the surface finishes have been stipulated on the drawings and described in B.O.Q which shall be provided.

8.3 **WORKMANSHIP**

Sandfill

Fill shall be placed in layers not exceeding 150 mm thickness and shall be thoroughly rolled and compacted mechanically by the addition of controlled amounts of water required to achieve a compaction of 95% AASHTO density. Compaction test at different places shall be submitted for approval of the Engineer. The Engineer shall have complete freedom in rejecting any work in full which is not properly compacted to the required degree. The top surface shall be finished smooth as to elevation or falls shown on the drawings or directed. This surface shall be made over to receive subfloor wherever required.

CHIEF ENGINEER
K.P.T

Ceramic Tiles Work
Materials
Cement
Cement shall be white cement as per ASTM or British Standard.

Sand
Approved sand shall be used which shall be clean, washed, uncoated aggregate, free from deleterious substance, uniformly graded with 100 percent passing No. 4 screen, not more than 5% passing No.100 screen and shall conform to ASTM C-144.

Tiles
Ceramic tiles shall be 1st quality "EMCO" brand or approved equal of 150 mm x 150 mm size. Tiles for floor work shall be non-skid type.

Workmanship
Ceramic tiles shall be installed as indicated on drawings and finishing schedules. The colour and samples of ceramic tiles shall be selected and approved by the Engineer.
Cutting of tiles shall be done in a neat manner to make tiles fit, to conform properly to adjoining works and to suit conditions, without marring the tile surfaces.

Ceramic Tiles on Floor
The work consists of laying ceramic tiles with 1:1 cement sand mortar slurry to achieve good bonding on levelling base of Class-B concrete and Lean concrete subfloor over hard core & sand fill laid to slope as required towards floor drains. The joints in the tiles shall then be filled neatly with grout of cement and integral colouring to match colour of ceramic tiles. The tiles shall then finally be cleaned and protected against abrasion and damage.

Ceramic Tiles on Walls
The work consists of laying ceramic tiles with 1:1 cement sand slurry to achieve good bonding. The joints in the tiles shall then be filled, finished and protected as per direction of Engineer.

8.4 **INSITU MOSAIC FLOOR**

12 mm thick insitu Mosaic floor shall be laid with one part by weight of cement to two parts by weight of approved marble chips size No. 3 of approved colour and quality. Addition of marble powder will not be allowed. The insitu mosaic shall be done in panels of maximum 10 sft using 1/4" (5 mm) thick glass divider strips. The insitu mosaic shall be cured, ground smooth to obtain an even texture and exposure of marble chips. The surface shall then be cleaned and finally wax polished.

INSITU MOSAIC SKIRTING.
Insitu mosaic skirting be done by using one part by weight of cement to two parts by weight of marble chip of size No. 3 to a thickness of 3/8” and shall be same colour and quality as sued for flooring. Addition of marble powder will not be allowed. The skirting should be either flush with the plaster or slightly recessed, skirting standing proved of the plaster surface shall not be accepted except where shown in the drawings. The skirting shall be ground smooth to obtain an even texture and exposure of the marble chips. The surface shall then be cleaned and finally wax polishes.

8.5 **CURING, GRINDING AND POLISHING:**
Floor should be kept continuously wet for seven days before grinding and no one shall be allowed to walk on floor during that period.
After seven days the terrazzo floor shall be machine ground to a true even surface using various grades of abrasive stones as required. After the first grinding, the floor shall be thoroughly grouted with the same cement and colour composition as used for tiles manufactured. The grout shall be of the consistency of thick cream ad shall be brushed over the floor to eliminate all imprisoned air and thoroughly fill the surface for final grinding.

The floor shall be kept continuously wet after grouting for atleast 7 days and then the grouting coat shall be removed by grinding. The final finished surface should have very smooth finish. Small areas, in accessible portions and corners and the skirting which cannot be reached by the grinding machine shall be ground and rubbed by hand.

CHIEF ENGINEER
K.P.T

After final grinding is complete the floor shall be washed and left for 7 days for drying. During this drying period, the floor shall be kept covered such that no dust is allowed to settle on the floor. After the floor is perfectly dry, the surface shall be thoroughly cleaned but without the use of water. Wax polishing shall then be applied to provide smooth glossy finish. The surface, then shall be covered with sawdust and all movements over the floor prevented. The final gloss shall be given by final coat of polishing to the satisfaction of the Engineer.

8.6 **SAMPLES**

Samples of all kinds of materials to be used on the job, shall be submitted to the Engineer and to be approved by him.

8.7 **MEASUREMENT AND PAYMENT**

Payment shall be made for the actual area covered in square measure and shall include all under base i.e earth filling, concrete subfloor, concrete base course, slurry base etc. for which no separate measurement or payment shall be made.

ITEM - 9 PLASTERING

9.1 **GENERAL**

The work covered by this Section of the Specification consists of furnishing all plant, labour, appliances and materials and in performing all operations in connection with lathing and plastering, complete in strict accordance with this section of the Specifications and the applicable drawings and subject to the approval of the Engineer.

Except as may be otherwise shown or specified, all plaster shall be cement plaster. Plastered walls shall include partitions, columns, pilasters, plastered jambs and other returns, reveals, and backs of recesses and alcoves, and jambs and heads of windows and doors, unless otherwise specified or shown on the drawings. Plaster on walls, shall be carried down to dado, skirting and projected bases.

9.2 **MATERIALS**

Portland cement shall be normal setting cement of approved make complying in respects with ASTM.

Sand shall comply with the requirements of ASTM C-35.

Water shall be clean and free from oils, acids, alkalies salts and organic or other injurious matter.

9.3 **MIXING OF MORTAR FOR PLASTER**

Mechanical mixers of an approved type shall be used for the mixing of mortar for plaster. Frozen, caked, or lumped materials shall not be used. Mechanical mixers, mixing boxes, and tools shall be cleaned after mixing each batch and kept free of mortar from pervious mixes. Mortar shall be thoroughly mixed with the proper amount of water until uniform in colour and consistency. Retempering will not be permitted, and all mortar which has begun to stiffen or where 30 minutes have passed since mixing of water shall not be used.

9.4 **PROPORTIONING OF PLASTER**

All plaster shall be portland cement plaster, all coats of which shall be mixed in the proportions of one part of cement and four parts of sand by volume unless shown otherwise in the relevant items of work in the Bill of Quantities.

All coats of plaster in water retaining structures shall be waterproofed by addition of an approved compound like PUDLO in liquid form or solid used at the rate of 3% by weight of cement. The water proofing compound shall be commercially pure with no clods or oils or other ingredients detrimental to the cement.

9.5 **APPLICATION OF PLASTER**

All the holes and blocking for the installation of electrical and mechanical fixtures and wiring, conduits and pipe sleeves, metal anchors of all types, openings for installation of equipments etc. shall be installed and approved before plastering. Cutting and drilling in finished plaster shall not be permitted.

Masonry joints shall be raked and concrete surface to receive plaster shall be thoroughly hacked to provide a rough surface for proper key to the plaster. The surface shall be properly wetted and a spray coat of cement slurry shall be applied before laying the plaster.

CHIEF ENGINEER
K.P.T

Two (2) coats of plaster shall be used on masonry and concrete surface where thickness is more than 13 mm. Plaster work shall be carried out only when the temperature is not less than 5^{o}C. Plaster shall not be applied when the surface contains frost.

In case of 2 coats the first coat shall be full and thick and shall be applied with sufficient force to form good keys. The scratch coat shall be cross-scratched upon attaining its initial set and shall be kept damp with a fog spray.

Finish coat shall not be applied until the first coat has seasoned for 2 days. Just before application of the finish coat, the first coat shall again be wetted evenly with a fog spray. Finish coat shall be smooth finished. The finish coat shall be kept moist with a fog spray for at least 2 days and thereafter shall be protected against rapid drying until properly and thoroughly cured.

All plaster shall be finished true in line, levels and plumb. The surface shall be even and smooth without travel marks, kinks, bulges or deformities of any sort.

9.6 **SAMPLING OF PLASTER**

Samples may be taken by the Engineer at any time from plaster work in place. Areas represented by samples which show over sanding will be rejected.

9.7 **PATCHING**

Plaster containing cracks, blisters, pits, checks, or discolouration will not be accepted. Such plaster shall be removed and replaced with plaster conforming to this Specification and approved by the Engineer. Patching shall match with existing work in texture and colour.

9.8 **CONCRETE/MASONRY JOINTS**

All joints of concrete and masonry walls shall be specially treated. A 200 mm wide approved G.I. wire mesh of 24 gauge weighing 1.5 kg/sq.m shall be securely fixed at the joint and then plaster shall be applied. The item for plaster shall include this wire mesh and no separate payment shall be made for the same.

Plaster shall be kept continuously wet atleast for 10 days and thereafter wetted atleast at the interval of 4 hours (or less if directed by the Engineer) for the next 10 days.

9.9 **MEASUREMENT AND PAYMENTS**

Payment against the item of plaster shall be made in square metres as per actual area plastered including jams without separate measurement of payment being made for providing wire mesh on concrete/masonry joints which shall be deemed to have been included in the rate of plaster the price & payment shall constitute full compensation for all costs involved in proper completion of work.

ITEM – 10 CARPENTRY, JOINERY AND HARDWARE

10.1 **SCOPE OF WORK**

The work covered by this section of the Specifications consists in furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with supply and installation of wooden doors, frames, panels, shutters, in size, thickness and dimensions shown on the drawings or as required, complete in strict accordance with this section of the Specifications and the applicable approved shop drawings (to be prepared by the Contractor) and subject to the terms and conditions of the Contract with materials and workmanship best of their kinds as used in Pakistan.

10.2 **MATERIALS**

The entire timber shall be from the heart of sound and full grown trees, it shall be uniform in substances, properly seasoned, straight in fibre, free from large, loose or dead knots, twists, cracks, incipient decay. The scantlings of all timber shall be bright sound and square edged. The colour of the timber shall be uniform throughout. The timber shall be tested before use to evaluate its suitability. The moisture content shall not exceed 10%. The Contractor shall pay for such tests. All timber before use shall be subject to the approval of the Engineer.

CHIEF ENGINEER
K.P.T

Hardware and Fittings
Brass fittings are to be furnished and oxidized on exposed surfaces. Aluminium fittings are to be anodized on exposed surfaces. Chromium plated fittings are to be the best quality of their respective kind and shall have a base coat of brass or copper all as approved. Brass oxidized fittings are to be fixed with brass screws.
Locks, handles/heavy handles, door stoppers, shall be as specified and approved by the Engineer.

Lock and latch furniture (doors) shall conform to relevant ASTM or BS 4951: (Builder's Hardware).

The whole of the iron, oxidized brass must be of the best possible quality and workmanship. The Contractor shall submit samples for the approval of the Engineer and all such iron, brass and bronze mongery shall conform to these approved samples.
Glue shall conform to the requirement of BS 745 for cake or powder glue.
Nails and Screws
Nails shall comply with requirements of relevant ASTM or BS 1202. Screws with the requirements of relevant ASTM or BS 1210.

Hold-fasts shall consist of 125 mm screws at 300 mm centre to centre in plastic plug countersunk and wood plugged.

Hinges
Heavy duty brass hinges and brass screws as per table given below and approved by the Engineer and as specified on the drawings:

WEIGHTS FOR TEN NOS. ARTICLES IN KG

(including weight of necessary screws)

SIZE IN MILLIMETERS

	50 Brass	75 Brass	100 Brass	125 Brass
Hinges Butt	0.39	0.85	1.42	2.27

Tolerance in weight 10%

All other fittings shall be best available of its kind as required and approved by the Engineer. Samples shall be submitted to the Engineer free of cost for his approval. All fittings such as hold-fasts, hinges, tower bolts, locks, door stoppers, door closers shall be included in the rates of items for doors and joinery and no separate payment shall be made on this account.

10.3 **FABRICATION**
The Contractor shall perform all necessary morticing, tenoning, grooving, notching, tonguing, housing, revetting, hard wood pinning on joints and all other work necessary for the correct jointing. The Contractor shall also provide all metal plates, screws, nails and other fixing that may be instructed by the Engineer or which may be necessary for the proper execution of the joinery work specified. The Contractor shall also be required to carry out all works necessary for the proper construction of all framings, and for their support and fixing in the building. All shop drawings to be prepared by the Contractor for the wood work shall be approved and initialled by the Engineer before being fabricated and fixed in position.
Any joinery which may show signs of defects arising from the unsound materials or defective workmanship before the expiry of the maintenance period shall be cut out and replaced at Contractor's own expense.

CHIEF ENGINEER
K.P.T

Solid well seasoned deodar wood frames as per Bill of Quantities or as shown on the drawings are to be prepared with posts tenoned with the heads. The shutters will be fixed to the frames with approved quality fittings. The frames will be fixed to the wall with 80 mm screws at 300 mm centre to centre in plastic plug countersunk and wood plugged.

Flush Doors shall be complying with BS 3444 (Sterling Plywood Industries Karachi or approved equivalent).

Flush doors shall be constructed of 3 mm commercial plywood. The thickness of shutter shall be 40 mm with 40 mm x 15 mm sheesham wood lipping.

The solid core shall consist of well seasoned soft wood battens.

Flush doors shall be manufactured by pressing under a specific pressure of 13 kg/sq.cm.

Bonding shall be done under pressure between the veneers and the core with synthetic resins under heat of water proof and water resistant qualities respectively.

Urea Formaldehyde for water resistant and melamine urea formaldehyde for water proof bonding types shall be used as these are highly resistant to micro-organism attacks.

The finished doors shall have a moisture content of 8 to 12% which is within the tolerance limit of twist and warp under BS 3444.

Each door shall be suitable to receive hinges and locks in the position shown.

Glazing wherever shown on the drawings or given in Bill of Quantities shall be Hasanabdal Glass or equivalent.

Anti-termite treatment of approved quality shall be applied to frames on the surface in contact with earth, or wall.
Three (3) coats of approved quality enamel paint over a coat of red oxide as primer coat approved quality wax or french polish shall be applied to the doors including door frames as per directions of the Engineer or as described in the description of items or in drawings. No additional payment shall be made against this item.

10.4 **SAMPLES**

Samples of corner section of each type of door, window and panel of each kind of wood and fitting e.g. locks, bolts, hinges, screws, holdfast shall be delivered to the Engineer for approval and ordering necessary tests to be arranged by the Contractor without cost.

10.5 **MEASUREMENT AND PAYMENT**

All doors, cabinets and wardrobes shall be measured in square measure of elevation measured between outer edges of the frames and shall include all the wood work/chip boards, formica etc., fittings and hardware, anti-termite treatment and painting/polishing etc. and no separate measurement or payment shall be made for any of such component items.

ITEM – 11 STEEL DOORS / WINDOWS

(A) STEEL DOORS

11.1. **SCOPE OF WORK**

The work covered by this section of the specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the furnishing and installing of steel doors with painting complete, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

11.2. **MATERIALS**

All materials shall be best quality and type used for the purpose. Material shall be free from all defects and imperfections that might affect the serviceability of the finished product and shall conform to relevant British Standard Specifications.

CHIEF ENGINEER
K.P.T

11.3. **MANUFACTURE**

Doors shall be constructed as indicated on the drawings, consisting of stiles, rails and other members of the frames and shutters. The drawings and details shown profiles and design of doors and pressed steel frames and these specifications describe minimum requirements. Stock fabricated items complying with these profiles, designs and requirements may be used subject to approval of the Engineer and provided the quality is at least equal to that specified. The work required under this, shall be made by an approved manufacturer regularly engaged in the production of the kind of work shown and specified. All door frames shall be constructed of steel single profiles as shown on the drawings and shall be provided with strip steel anchor 1/4" x 3/4" x 12" split at the end, 30" c/c.

11.3.1 **Construction**

Construction joints of steel work shall be continuously welded full depth and width or equivalent splice plates where so directed shall be welded on unexposed faces of frames. Exposed surfaces of welded joints shall be mitred and butt welded and shall be dressed and flat finished to produce invisible connections, spot welding may be used where practicable and if approved by the engineer.

11.3.2 **The Finished Work**

The work shall be strong and rigid, neat in appearance and free from defects. Plain surfaces shall be smooth and free from warp or buckle. Moulded members shall be cleaned out straight and true. Miters shall be well formed and in true alignment. Fastenings shall be concealed where practicable. All doors and door frames shall be cleaned by a hot dip phosphate or a cold phosphate chromate treatment. Immediately after drying these shall be applied with two shop coats of approved rust-inhibitive paint such as red oxide which will produce a hard tough film of good appearance, flexibility and rust resistance and then painted with 3 coats of approved enamel paints.

11.4. **CUT-OUTS**

Cut-outs where so required shall be accurately located and made to fit the hardware. Cut-outs shall have dust covers of galvanised sheet welded in place to prevent mortar and plaster from contact where the reinforcing plates and lock strikes.

11.5. **CLEARANCE**

Unless directed otherwise, doors shall have not more than 1/8" clearance at jambs and heads and not more than 3/8" clearance from floor or from threshold at the bottom, and shall have the proper level on lock stiles rails to operate without bending. They shall be made strong and reinforced at corners sufficiently to prevent sagging or twisting.

11.6. **BASE ANGLE AND SPREADERS**

Where required the base angle for fastening to floor shall be welded to each jamb section. Provide removable angle spreaders securely fastened to bottom of each jamb.

11.7. **INSTALL FRAMES AND DOORS**

Install frames plumb, grout, rigid and in true alignment and braced to retain position and clearance during construction of walls and partitions. Doors shall be installed in accordance with the working drawings and the instructions of the Engineer.

The doors shall be provided with all hardware, necessary for an efficient operation, such as hinges, lock sets, latchsets, cylinders, levers, lifting and sliding accessories. The final selection of the hardware, which shall all be the best of its kinds, shall be done during the execution of the contract, by the Engineer.

11.8. **PAINTING**

For painting and its application the specification given painting and finishing Chapter of the Specifications shall be followed.

(B) STEEL WINDOWS

11.9. **SCOPE:**

The work covered by this section consists of furnishing all labour, equipment, supplies and materials and in performing all operations in connection with the fabrication, construction and installation of metal windows, complete, in strict accordance with this section of the Specifications and the applicable Drawings, and subject to the terms and conditions of the Contract. Insect screens shall be provided in the locations where required by the Drawings.

CHIEF ENGINEER
K.P.T

11.10. **LOCATIONS AND QUANTITIES:**

It is the intent of the Specifications to indicate the quality, character and type of the items. All locations and quantities of the various items shall be obtained from the drawings.

11.11. **STANDARD MANUFACTURED ITEMS:**

The Specifications describing the individual items indicate the type, construction, size or style, but substantially meeting the requirements specified, may be acceptable provided the quality is at least equal to the specified, and provided approval is obtained from the Engineer prior to purchase. The contractor shall clearly describe any deviation from the Drawings and Specifications for the items he proposes to furnish.

11.12. **CONSTRUCTION:**

Steel windows shall conform to relevant ASTM or BS 990 Part 2. All metal windows and screens shall be the products of a reputable manufacturer of metal windows approved by the Engineer. Windows shall be of the type indicated on the drawings and shall conform to the requirements herein specified for the respective types:-

Each window and screen shall be complete including all anchors, clips, bolts, mullions, and hardware and all attachments required for the installation of window screens.

Drips and weep holes, where required for satisfactory drainage shall be in accordance with manufacturer's standard practice for windows of the various types.

All metal window mullions shall be standard sections.

Where indicated on the drawings, provide openable sections of windows conforming to requirements hereinafter specified.

All windows shall be left in satisfactory operating condition and shall be water-tight.

11.13. **STORAGE:**

Windows and screens shall be stored in a vertical position at the site to prevent distortion or injury to hardware or finish.

11.14. **VERTICAL MULLIONS:**

Unless otherwise detailed on the drawings, vertical mullions required to combine two or more windows in a single opening shall be the manufacturer's standard mullion complete with bolts for attaching, and with inside and outside covers.

11.15. **ANCHORS:**

The windows shall be provided with all necessary clips and anchors required for attaching windows to steel, concrete, and/or masonry as required by the drawings.

11.16. **ERECTION:**

Windows shall be erected in prepared opening in accordance with the relevant drawings/details. They shall be set plumb and true, properly aligned and securely anchored as shown on detail drawings, with all ventilators correctly adjusted before glazing, joints at mullions between connecting windows and contact of windows with masonry sills shall e bedded in mastic. There shall be one (1) anchor at the top and bottom of each jamb and at not over 3'-0' intervals between jambs.

Anchor, clips and belts shall be furnished.

11.17. **CAULKING:**

All fixed joints between various parts of the windows assemblies shall be buttered with caulking compound before the windows are assembled. All joints between windows and surrounding masonry construction shall be caulked with gray caulking compound of standard make.

11.18. **GLAZING:**

All windows shall be provided with best quality sheet glass 1/4" (5 mm) thick fixed with putty and deodar wood beading. Also refer relevant Chapter of the Specifications.

11.19. **MEASUREMENT AND PAYMENT:**

Doors and windows shall be measured in square measure between outer edges of the frames and top edges of the frame to floor level in case of doors. No separate measurement or payment shall be made for component items, such as hardware, glazing chaulking, painting etc.

CHIEF ENGINEER
K.P.T

ITEM - 12 GLAZING

12.1 **SCOPE OF WORK**

The work covered by this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials, and in performing all operations in connection with this Section of the Specifications and the applicable drawings subject to the terms and conditions of the contract.

12.2 **MATERIALS**

All glass shall be from an approved local manufacturers and of approved best quality free from specks, bubbles and other defects and give clear undistorted vision. It shall be 5 mm or 6 mm thick or as shown on drawings/described in Bid Schedules or directed. All glass to generally comply with relevant ASTM or BS 952.

Putty

Putty shall be made as follows:
930 gm fine powder whiting
58 gm white lead (dry)
350 gm raw linseed oil
30 gm litharge
for glazing in metal ashes, 5% red lead should be added.

Glazing Compound

It shall be a standard product of manufacture; and a composition approved by the Engineer.

12.3 **INSTALLATION**

Materials installed under this section shall be certified to be as specified hereinbefore in quality, colour, performance and pattern.

All glass shall be cut accurately to the required sizes and all the edges shall be cleaned out.

Glass cut incorrectly, damaged or not meeting minimum requirement specified above shall be removed from position immediately and replaced.

Glazing shall be done in weather proof and water proof conditions. If the work schedule requires glazing work to be done at temperature below 5 degree C, proper grade of glazing compound (sealant) as certified by the manufacturer shall be applied according to manufacturer's direction with work full guaranteed.

Glazing beads shall be removed while performing glazing operation. Beads to be set back in correct locations.

Glass shall be set in with equal bearings on entire perimeter with the help of clip and putty. Glazing surface shall be clean, dry, completely dust free before commencing application of glazing material.

Excess sealant compound shall be removed immediately from glass and other adjacent surface to prevent permanent stains or other damages to said surfaces.

12.4 **ACCEPTANCE AND CLEANING**

Labels showing glass manufacturer's identity, type of glass, thickness and quality will be required on each piece of glass. Labels must remain on glass until it has been set and inspected.

The Contractor shall clean all work on completion. Clean up all stains, marks, spots and disfigurements from all work, touch up as required, clean all window panes, remove all rubbish and debris from building and site and leave premises clean and tidy and fit for occupation in all respects and to the entire satisfaction of the Engineer.

Glass shall be protected against damage. After inspection any label, paint, smears, stains, dirt, shall be removed from the glass, and the glass shall be washed clean on both sides taking care not to scratch or damage the glass. Damaged or broken glass shall be removed and replaced with new glass of same kind before acceptance.

12.5 **GUARANTEE**

Contractor shall, and does hereby guarantee as part of the Contract, that all glazing joints in exterior openings shall remain water tight for a period of at least two years after the final acceptance of the buildings. The Contractor shall also guarantee that during the above period, caulking compound shall not crack, dry out, crumble or fall away from sash on glass.

12.6 **SAMPLES**

Samples of all kinds of materials to be used on the job shall be submitted to the Engineer for approval before the same are procured.

CHIEF ENGINEER
K.P.T

12.7 **TESTING**

All materials shall be subject to standard testing and specifications such as ASTM Standard C-797, if found below the standard the same shall be rejected and removed from the site immediately.

12.8 **MEASUREMENT AND PAYMENT**

No separate payment for the work described in this section of the specifications or incidental thereto shall be made to the contractor and his quoted price for doors, windows, ventilators fixed panel etc. shall be deemed to be inclusive of glass and glazing where the same is to be fixed.

ITEM - 13 EXTERNAL FINISHES/ PAINTING

13.1 **SCOPE**

The work covered by this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with protective and general painting steel, wood, plaster work, concrete surfaces etc. all as directed and finishing complete in strict accordance with this section of the Specifications and the applicable drawings, Description of Items and subject to the terms and conditions of the contract.

13.2 **GENERAL**

The term "Paint" as used herein includes, emulsions, enamels, paints, distempers, stains, varnishes, sealers, primers, colour washes etc. All colours shall be subject to the approval of the Engineer.

13.3 **MATERIALS**

Paints shall be well ground, shall not settle badly, cake or thicken in the container, shall be readily broken up with a paddle to a smooth consistency and shall show easy brushing properties. The paint shall be suitable for spraying when thinned with not more than 12 percent by volume of mineral spirits. All paint materials shall be delivered to the job in original unbroken containers with labels and tags intact.

All paints shall be the best of their kind as used in Pakistan and a first class quality product made by an approved manufacturer of good standing and repute and shall conform to the requirements of current British Standard Specifications or ASTM Standards.

All colours shall be pure tint colours ground in linseed oil and guaranteed non-fading.

Colour shall be lime proof where used on cement block, concrete, or plaster.

All colours and shades shall be as directed by the Engineer. The colour of each coat of paint shall be a different shade from that following.

Until and unless specified or directed otherwise, paints shall be of Berger Pakistan Ltd's paint or equivalent. Colour wash shall mean coloured chalk applied with glue at the rate of 2.25 kg per bag of 30 kg chalk. Chalk wash shall mean white chalk with glue at the rate of 2.25 kg per bag of 30 kg.

13.4 **PROTECTIVE PAINTS**

Unless otherwise specified all exterior and interior ferrous metal surfaces, except reinforcing steel, bolts, rough hardware and metals with non ferrous coatings shall be given a shop coat of protective paint (zinc compound). Paint shall conform to the requirements of ASTM D-80. Surface to be painted shall be thoroughly cleaned of scale, dirt, and rust by the use of steel scrapers, wire brushes, sand blast or other equally suitable tools or methods. Oil and grease shall be removed with benzene or other suitable solvent. Paint shall be kept well stirred while it is being applied. No paint shall be used after it has caked or hardened. Paint shall be well worked into all joints and corners. Paint shall not be applied to damp surfaces nor when the temperature is below 5 degree centigrade.

13.5 **GRAFFITO**

This textured finish is based on quartz powder around 300 mesh and silica sand averaging 70 mesh. Split up mesh sizes are used for improving the conglomeration. A round stone of desired mesh size is used to create the radial or linear effects.

Graffito shall be applied as external finish on external plastered surfaces (13mm thick, 1:4 plaster).

13.6 **SAMPLES AND TESTS**

Samples of each type of paint and each colour proposed for use shall be submitted to the Engineer and approval thereof received before the material, represented by the sample, is used on the project. Samples shall consist of 1 pint and 3 displays of each type and colour of paint applied to material strips 50 mm by 150 mm. Back material used for display stains, shall be the same kind as that on which the stain is ultimately to be applied. In addition to the submission of

CHIEF ENGINEER
K.P.T

samples, the Contractor shall submit authenticated report of tests of the materials proposed for use, as directed by the Engineer.

13.7 **PREPARATION OF SURFACES**

General

Hardware, accessories, plates, lighting fixtures, and similar items in place shall be removed prior to painting operations and completion of the painting in each space, or shall be otherwise protected. All surfaces to be painted shall be clean, smooth, dry and free from dust, grit and other objectionable materials.

Concrete and Plaster Work

Concrete and plastered masonry surfaces to be painted shall be prepared by removing all dirt, dust, oil and grease for good adhesion for the paint. The method of surface preparation shall be left to the discretion of the Contractor, provided the results are satisfactory to the Engineer. Nails and similar exposed metal occurring in concrete or plaster surfaces shall be coated with shellac or oil paint before the cement-water paint is applied. All surfaces required to be painted with oil-base paints shall be free from alkali and shall be thoroughly dry before paint is applied.

Plaster shall be sufficiently old and shall be thoroughly dry, clean and free from grit, loose plaster, and surface irregularities before paint is applied. Cracks and holes shall be repaired with patching plaster with approved additive such as "Thorite" and properly keyed to the existing plaster. All plaster surfaces shall be tested for the presence of alkali, which if present, shall be removed with a solution of zinc sulphate mixed in the proportion of 1 kg to 1.5 kg of compound to 4 liters of water. After drying, the precipitate shall be removed by brushing. Plaster patches shall be worked to match the appearance of the adjoining plaster.

Before the application of the cement-water paint, all holes in joints or masonry plaster surface shall be filled with mortar and suitably tooled and caulking installed around wood or metal frames built into masonry, shall be thoroughly checked. Plaster surface shall be cleaned and free from dust, dirt, grease, or any other material which might affect the proper adhesion of paint. Surfaces shall be thoroughly dampened with a fine spray of water before application of paint.

Internal Painting of Concrete and Plastered Surfaces (Distemper)

All the surfaces shall be prepared as stated in sub item 15.7 hereinbefore.

Irregularities in the surfaces shall be made smooth by applying coat of proper putty such as Berger Robbialac plastron putty or approved equivalent.

Finished surfaces shall then be treated with one coat of Berger Robbialac plastron wall primer sealer or approved equivalent.

3 coat of Synthetic Polyvinyl Distemper of Berger Robbialac make or approved equivalent shall then be applied.

Application of primer and paint in coats shall be done strictly in accordance with the manufacturer's instructions.

External Painting of Concrete and Plastered Surfaces (Weather Shield Paint)

All the surfaces shall be prepared as stated in sub item 15.7 hereinbefore.

Irregularities in the surfaces shall be made smooth by applying coat of proper putty such as Berger Robbialac plastron putty or approved equivalent.

3 coat of Berger Robbialac Chlorinated Rubber Base Paint or 3 coat of "Weather Fighter" brand paint of Buxly Paint Ltd. Pakistan or approved equivalent shall be applied.

Application of primer and paint in coats shall be done strictly in accordance with the manufacturer's instructions.

CHIEF ENGINEER
K.P.T

External Painting of Concrete nd Plastered Surfaces (Snowcem / Durocem)

Before the application of the cement-water paint, all plastered surfaces shall be clean and free from dust, dirt, grease, or any other material which might affect the proper adhesion of paint. After application of paint the surface shall be water cured as per manufacturer's instructions.

Mix the paint in accordance with the manufacturers' directions and allow it to stand 30 to 45 minutes. Before application mix to uniform consistency and stir frequently during application. Dampen, but do not saturate, the surface uniformly by spraying for several minutes and let the moisture penetrate through. Apply the paint with a brush having relatively short, stiff, fibre bristles by scrubbing the paint into the surface voids. Cure the first coat by keeping the surface damp for at least 24 hours; spray the surface as soon as the paint has hardened sufficiently to resist injury and repeat the spraying as often as necessary to keep the surface damp before applying second coat. Apply the second coat in such a manner as to completely cover the first and cure as specified above, except that curing shall be continued as long as practicable, and for not less than 48 hours. Apply the paint in the shade rather than in bright sunlight, specially avoiding painting during warm windy weather. In applying the finish coat, layout the work so that an entire wall surface may be completed in one operation; if this is impracticable, carry the painting to some natural stopping point.

Metal Work

Shop-primed metal work shall be kept clean and free from corrosion following installation. Abraded surfaces shall be retouched prior to finish painting, using the same type of paint as the priming coat (zinc compound).

Wood Work

Small, dry, seasoned knots shall be thoroughly cleaned and scraped, and shall be given a thin coat of orange shellac varnish before the priming coat is applied. Large, open, unseasoned knots and all beads or streaks of pitch, shall be heated by a blowtorch and then scrapped off, or, if the pitch is still soft, it shall be removed with mineral or denatured alcohol. Resulting voids, if any, shall be filled with putty. Nails shall be set. Painting shall proceed only when, in the opinion of the Engineer, the wood is satisfactorily dry.

13.8 **APPLICATION OF PAINTS**

All the work shall be done in a workmanlike manner, leaving the finished surfaces free from drips, ridges, waves, laps, and brush marks. Except as specified or required for, cement-water paints shall be applied under dry and dust-free conditions and unless otherwise approved by the Engineer shall not be applied when the temperature is below 5 degree centigrade nor when a temperature drop of 11 degree centigrade or more is in forecast. All primer and intermediate coats of paint shall be unscarred and completely integral at the time of application of each succeeding coat. Each coat of paint shall have slight variations of colour to distinguish it from the preceding coat. Sufficient time shall be allowed between coats to ensure proper drying. Paints shall be thoroughly stirred and kept at a uniform consistency during the application and shall not be opened until required for use. Except as otherwise, paint may be applied by the spray method except during cold weather or when, in the opinion of the Engineer, spraying in any particular application would produce unsatisfactory result. Floors, roofs and other adjacent work shall be properly protected by drop cloths or other covering.

Polishing/Painting of Wood Work

Wood work (and including also the inside face of exterior doors and frames) shall be stained to match an approved sample prepared by the Contractor and given three (3) coats of spar varnish. Top and bottom edges of doors shall be given three (3) coats of spar varnish.

Wherever indicated otherwise on the drawings, the wooden doors and partitions shall be painted with three (3) coats of enamel paint. All wood work specified to be painted shall be primed in all sides in the shop before delivery to the job. After the priming coat has been applied, nail holes, cracks, and other depressions shall be filled flush with putty, coloured to match the finish coat and sand-papered smooth. Putty shall be dry before subsequent painting. Glazing rabbets and beads in exterior glazed doors shall be given 1 coat of exterior primer before glazing. All exposed putty shall be painted.

CHIEF ENGINEER
K.P.T

Ferrous Metal Work (Enamel Paint)
Exterior ferrous metal surfaces shall be painted three (3) coats of exterior oil enamel paint after the protection coat of zinc compound.

Protective Coating
All structural steel should be given a shop coat of anti-rust protective paint (zinc compound) of standard manufacturer. Paint shall conform to the requirements of B.S. 2523, type "A" or equivalent ASTM standard. Surface to be painted shall be thoroughly cleaned of scales, dirt and rust by the use of steel scrapers, wire brushes, sand blast or other equally suitable tools. Oil or grease shall be removed with benzene or other suitable solvent. Paint shall not be applied to damp surface nor when temperature is below 5 degree centigrade.

Surface Treatment and Painting
After each item of metal work has been fabricated, the Contractor shall clean and prime paint and/or protect it in the manner specified herein. All exposed surface of structural steel members, shall have all oil and grease removed by washing with a suitable solvent. The surfaces shall then be thoroughly cleaned to expose clean metal.
Following the above surface treatment and on the same day and before any visible rusting takes place, apply 0.05 mm dry film thickness of an approved red oxide/zinc chromate primer. The primer shall be of a high quality.

This shall be followed by at least two (2) coats of approved first quality enamel paint. The first coat or under coat shall be of the specified colour in flat base paint and shall fully mask the prime coat. The second coat or finish shall be of an approved alkaloid resin pigmented enamel paint. Each coat to have a minimum dry film thickness of 0.05 mm. Primer and paint shall be of I.C.I. Pakistan or Berger Paints or approved equivalent.

Where mating machine ferrous surfaces are required to remain in contact after shop assembly, each together with the shanks and threads of bolts used, shall immediately before assembly, be uniformly coated with a thin mixture of white lead and graphite in oil.

All exposed bright and/or ferrous surface not intended to be painted, including exposed screw threads, shall be cleaned and given a heavy uniform coating of petroleum soluble rust preventative compound. Such protection shall be adequate to prevent corrosion during transport and/or storage in the open.

Where mating unmachined ferrous surfaces will be in permanent contact after strop assembly, each surface shall receive the surface treatment as specified above followed by one coat of red oxide/zinc chromate and the surfaces shall be brought together whilst the paint is still wet. All coatings shall be applied by qualified trades men painters. Painting shall not be carried out in unsuitable weather when humidity is less than 80% and the temperature is above 40^{o}F or higher temperatures if recommended by the manufacturer. Spray painting shall be adopted wherever possible. All paints shall be used and mixed according to the manufacturer's instructions, including thinning, if necessary. Finishes shall be smooth and free from brush marks. Minimum drying and curing times recommended by the manufacturers shall be strictly observed before recoating.

Application of all coating systems shall be carried out in accordance with the instruction of the manufacturer. Colour scheme and paint shades shall be approved by the Engineer.

Buried Piping
All steel piping and all exposed threads of galvanized piping, where run in or through concrete or masonry, or buried underground, shall be given one (1) coat of approved asphalt varnish.

13.9 **CLEARING**
All cloth and cotton waste, which might constitute a fire hazard, shall be placed in metal containers or destroyed at the end of each work day. Upon completion of all work, all staging, scaffolding and containers shall be removed from the site or destroyed in a manner satisfactory to the Engineer. Paint spots, oils, or stains upon adjacent surfaces shall be removed and the entire job left clean and acceptable to the Engineer.

13.10 **MEASUREMENT AND PAYMENT**
Measurement of painting work of distemper, emulsion and snowcem / durocem on concrete/plastered surfaces, application of graffito on plastered surfaces shall be made for actual area painted/treated and paid for as per rates of pay items in B.O.Q.

CHIEF ENGINEER
K.P.T

Enamel painting of steel and wooden surfaces of doors, windows, cabinets, wardrobes etc. shall not be measured or paid and the same shall be deemed to be included in the rates of these items of wood and metal work in the Bill of Quantities.

ITEM - 14 CAULKING (SEALANT OR MASTIC)

14.1 SCOPE

The work covered by this section of the Specifications consists of furnishing all plant, labour, equipment, appliances, and materials, and in performing all operations in connection with the application of caulking complete, subject to the terms and conditions of the Contract, and in strict accordance with this section of the Specifications, applicable Drawings and Descriptions of items.

The Contractor shall caulk at the sills, jambs, and heads of all windows and louvers and at the jambs and heads of all doors in walls. He shall also caulk the joints and intermediate joints of windows sills and around the perimeters of concrete framing members such as columns, masonry, and beams. Caulking noted on the Drawings as "Mastic" shall be included under this section.

Caulking occurring in connection with joints in concrete floors, in walls, and roofing and sheet metal work is also included in this section.

14.2 MATERIALS

Materials shall conform to the following requirements:

Caulking Compound

Caulking compound shall be elastic waterproof and non-corrosive, firm when set, but not hard or brittle and shall have "Elastomeric" properties. Oils shall not leave the body of the materials to such an extent as to extend beyond the periphery of the material when it is applied to any type of masonry. It shall be of such composition that a thin tough skin will form an exposed surface while underneath remains plastic indefinitely. It shall have no tar or asphalt content, but shall be composed of specially prepared porous pigments so treated that they will absorb and retain sufficient oil to provide long life, elasticity, and complete and permanent adhesion to wood, iron glass, concrete, concrete blocks, and masonry. It shall show no sagging puckering, cracking, or shrinking under any weather conditions after application. The colour of the caulking compound shall match the colour of the adjacent surfaces. Delivery of the caulking compound to the project site shall be in the manufacturer's original sealed package, bearing the name of the manufacturer.

Sealer

The sealer for the joint grooves in masonry shall be a quick-dry liquid, and of a type and consistency recommended by the manufacturer of the caulking compound.

Rope Yarn

Rope yarn shall be the beveled strands of rope fiber, free from oil or other staining element.

14.3 SAMPLES

Before the work of application is started, samples of all materials proposed for use shall be submitted to the Engineer for approval.

14.4 APPLICATION

Caulking compound shall be applied by the gun method using nozzles of proper sizes to fit the several widths of the joints. The type of gun shall be subject to approval by the Engineer.

Preparation

Caulking in joints shall be a minimum of 20 mm in depth and 4 mm in width, unless otherwise indicated on the Drawings. Where adequate grooves for caulking have not been provided, grooves shall be prepared by cutting and cleaning out the mortar to the minimum depth and by grinding to the minimum width, taking care that adjoining metal work is not reduced in section. All particles of mortar, dust, and other foreign matter shall be brushed out and just prior to caulking, the joint grooves shall be treated with an application of sealer, where a suitable mortar backs top has not been provided, the back of joint grooves shall be packed tightly with rope yarn.

CHIEF ENGINEER
K.P.T

Caulking
The compound shall be driven into the joint grooves with sufficient pressure to force out all air and to fill the joints grooves solidly. Caulking joint where exposed, shall be free of wrinkles and shall be filled slightly convex to obtain a flush joint when dry. Upon completion of the caulking any caulked joints not entirely filled shall be roughened and filled as specified and the exposed surface tooled smooth.

Cleaning
The surfaces of all materials adjoining caulked joints shall be cleaned of any smears of compound or other soiling due to the caulking application.

14.5 **GUARANTEE**
The Contractor shall, and as part of his contract does, guarantee that for a period of three (3) years after acceptance of the Contractor's work, the caulking will be weather tight and the caulking compound will not become brittle, sag, run, or crumble or fall out of place.

14.6 **MEASUREMENT AND PAYMENT**
No separate measurement or payment shall be made for caulking work described in this section. The cost of caulking work shall be deemed to be included in the rates/prices of related items of work in the Bill of Quantities.

ITEM - 15 WATERPROOFING

15.1 **SCOPE OF WORK**
The work covered by this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the application of Water Proofing as specified hereunder complete, in strict accordance with this section of the Specifications and the applicable Drawings, Description of items and subject to the terms and conditions of the Contract to the entire satisfaction of the Engineer.

15.2 **GENERAL**
All materials shall be delivered to the site in containers with labels, comments and seals unbroken and shall not be opened until inspected by the Engineer. Work required under this Section of Specifications shall not be performed when ambient temperature is lower than 5^{o}C or during rain or snow or where surfaces are damp.

15.3 **MATERIALS**
Bitumen for Roofing shall be an asphalt with the following characteristics and shall be a standard manufacture of National Petrocarbon Ltd. or equivalent as approved by the Engineer.

		Max.	Min.
i)	Specific Gravity at 25^{o}C	1.06	1.01
ii)	Softening Point (Ring & Ball Method)	93^{o}C	80^{o}C
iii)	Penetration at 25^{o}C, 0.1 mm	35	20
iv)	Ductility at 25^{o}C, Min. cm	-	3
v)	Loss on heating (ASTM), Max.% wt.	0.05	-
vi)	Solubility in CCL4, Min.% wt.	-	99
vii)	Pouring temperature ^{o}C	180^{o}C	170^{oC}
viii)	Flash Point	-	200^{oC}

Precast stools
Precast stool shall be concrete class-E of size 300x300x100 mm high.

CHIEF ENGINEER
K.P.T

15.4 **SAMPLES AND TESTS**

Samples of all materials prepared or ordered for use in works under this section of the Specifications and a written statement indicating exact proportions, method of mixing, constant weight per cubic metre and method of application etc., as per manufacturer's instructions shall be submitted to the Engineer. Necessary tests as required by the Engineer shall be carried out by the Contractor at his own cost to establish their suitability and ascertain the quality claimed.

15.5 **PREPARATION OF SURFACES**

Construction of the roof slab and related work shall be completed prior to start of application of roofing materials. The surfaces shall be thoroughly clean, free of dirt and foreign materials and shall be dry, firm and smooth. Vents and other projections shall be properly flashed and secured in position. No damp proofing or roofing materials shall be applied prior to approval of the condition of the roof surface by the Engineer.

15.6 **APPLICATION OF MATERIALS**

All applications shall be in strict accordance with ASTM D-1327 and the manufacturer's specifications as approved.

No material shall be applied when temperature is below $5^{o}C$ or during rain or snow or where surfaces are damp.

Asphalt shall not be applied when its temperature exceeds $180^{o}C$. Heating of asphalt shall be rigidly controlled by means of an approved type thermometer suitably suspended over the kettle while heating is in progress and it shall not be heated above $245^{o}C$.

15.7 **ROOF WATER PROOFING**

Scope

The work covered by this section of the Specifications consists of furnishing all plant, labour, equipment, appliances and materials and in performing all operations in connection with the application of insulated roofing including felt water proofing, flashing and concrete protective stools and roofing screed, complete in strict accordance with this section of the Specifications and the applicable Drawings, and subject to the terms and conditions of the Contract.

The work under this section of the Specifications comprises the following:

Installation of Roofing

a) One prime coat and two flood coat of SIB 10/20 hot bitumen at the rate of 15 kg. Per 100 sq.ft. each over RCC slab.

b) Apply one layer of polythene sheet 0.20 mm laid 75 side laps and 100 mm end laps staggered with layers bonded together with bitumen, broom sheet to ensure that it is free of wrinkles.

c) Earth shall be laid to desired slopes and tiles shall be laid on a mortar bed (average thickness 75 mm) to the required slopes as shown on plans. The preparation of mud plaster shall be as follows:-

The clay containing sand not more than 5% shall be laid out in stakes not exceeding 12" height and saturated with water and allowed to stand for not less than 3 days, water being added during this period to ensure complete saturation. The binding material (Bhoosa) shall then be added and the mixture well puddle and left 2 days or so. It will then be thoroughly mixed to the required consistency of mortar and laid to slope.

d) Brick tiles of specified size and first class quality shall be laid wet, grouted and pointed flush in cement sand mortar (1:2). The top surface shall be smooth and accurately level in accordance with the specified slopes. No brick or cracked tile to be used. Special Tiles for sloped roof shall be laid as per details shown on the drawings

15.8. **CURING**

Tiles, after laying, grouting and flush pointing is completed, shall be kept wet throughout for at least seven days.

15.9. **PROTECTION**

The Contractor shall take each and every care to maintain the slopes levels and shall protect the work from any damage. The Contractor shall have to remove, replace and rectify such damaged work at his own cost.

CHIEF ENGINEER
K.P.T

Screeding

Laying of Class-B cement concrete plain screeding of average thickness of 50 mm shall be started using approved quality 10 mm & down graded crush stone & approved quality sand. All concrete to be machine mixed, laid in required slope compacted & properly cured.

Bitumen/Sand Water Proofing (where shown on drawings)

After thoroughly cleaning the concrete surface and removing all dirt and dust, Hycarb A-20 shall be applied at the rate of 2 kg/sq.m while sufficiently hot, coarse sand shall be spread evenly and pressed into the Bitumen Coat such that entire surface is fully covered.

15.10 **MEASUREMENT AND PAYMENT**

Measurement and payment shall be made for the composite work for the roof area covered and measured in square measure. No separate measurement or payment to be made for component items of screed, waterproofing layers, stools, etc.

ITEM – 16 DAMP PROOFING

16.1. **DESCRIPTION**

The Damp Proof Course shall be horizontal and vertical as shown on the drawings and specified in the Bill of Quantities.

16.2. **HORIZONTAL**

16.2.1 In Walls

The horizontal D.P.C. shall consist of 50 thick, Class-B cement concrete with two (2) sand blinded coats of Hycrab-A-20

16.2.2 Under Floors

Same as in walls except bitumen layers to be laid on 12/20 mm blinding screed (1:6) to even out surface of lean concrete hard core.

16.3. **VERTICAL**

The vertical D.P.C. shall consist of 20 thick 1:3 cement sand mortar with 5% pudlo and two (2) sand blinded coats of hot Hycrab-A-20

16.4. **MATERIAL REQUIREMENTS**

All material i.e. cement, sand aggregate, water polythene sheet and bitumen shall conform to the specification given in respective section.

16.5. **CONSTRUCTION REQUIREMENTS**

The Contractor shall lay the D.P.C. only when the level, quality of masonry work, etc. is approved.

The concrete work of D.P.C. shall conform to the relevant specifications given in this section for the execution of these items.

Horizontal D.P.C. shall extend to the full width of the wall i.e. upto the external faces. No portion of doors opening, etc. shall be left while laying D.P.C. The period of curing of concrete shall be not less than 72 hours. Every care should be taken that concrete is not left dry during this period. The work of laying Damp Proof Course shall be carried out as follows unless otherwise described in BOQ:-

a. Placing 2" layer of Class-B cement concrete.
b. Laying 2 Coats of hot bitumen Hycrab-A-20 grade @ 20 lbs. per % sq.ft. (each coat) over entire width and lengths of concrete after the concrete has been properly cured for at least 72 hours, and sand blinding where specified.

The application of bitumen coating in case of vertical D.P.C. shall be same as mentioned above.

16.6. **MEASUREMENT AND PAYMENT**

The measurement shall be made in per sq.ft./M by measuring length and breadth/height of actual work done and as shown on the drawings.

CHIEF ENGINEER
K.P.T

ITEM - 17 TERMITE CONTROL

17.1 **SCOPE OF WORK**

The work covered by this section of Specification consists of furnishing all labour, materials, equipments, services, miscellaneous and necessary items required to complete Termite Control Work, related works as indicated on Drawings specified herein or described in description of items.

17.2 **MATERIALS**

Pesticides shall be solution of an approved chlorinated hydrocarbon such as 0.5% Dieldrin or 0.5% Aldrin mixed in clean water for application in earth, and mixed with pure turpentine for application to wood.

Pesticides (Dieldrin and Aldrin) shall be obtained under permission of the department controlling their sale in Pakistan, in sealed drums at rate in force at the time of their acquisition and only in the quantity necessary for work of this Project. All mixing shall be done at site and the amount of pesticides used shall be verified by the Engineer.

17.3 **METHOD OF APPLICATION**

Pesticides solution shall be applied with approved pressure spraying equipment maintaining a pressure of 1N/mm^2 (10kg/cm^2) to all applications to, on or in earth. Spraying to wood shall be done by hand compression sprayers with an approximate pressure of 0.15 N/mm^2

17.4 **EXTENT OF APPLICATION**

All excavation, all walls and bottoms of all pits or trenches for footings or foundations are to be sprayed. Pesticide shall penetrate to a depth of 12" minimum in porous earth at bottom and 3" minimum at sides of excavations.

Stockpiled excavated material to be used as back fill is to be spray treated as above. After backfilling to plinth level, area of the whole building upto 10'-0" outside the building line is again to be sprayed penetrating a minimum of 12" into soil.

After grading, compaction and levelling and before formation of hard core/soling under floor slabs all areas to receive slabs shall be sprayed with pesticides, penetrating a minimum of 12" into soil.

All rough wood work for the entire project shall be pesticide treated (before application of solignum in the case of material to receive both treatments). Pesticide shall be sprayed on all surfaces of blocking, furring planks, scantlings, boards etc. before installations. Spraying shall be once again done at the site, after delivery and before installation. All spraying will be done within one week of working of the material.

17.5 **LOCATION AND SCHEDULING**

Saturation of earth is to be done by adequate personnel and in such a manner as to in no way disrupt the progress of work.

Spraying of rough wood work will be done on or near the site at location and in such enclosures as proposed by the Contractor and approved by the Engineer. Such work is to be scheduled and done by sufficient skilled personnel as to in no way impede the progress of the work.

Care shall be exercised to ensure that no marks or damage occurs to the finished building as a result of the work under this Section, and Contractor shall verify and ensure that no material used herein will impede the growth of grass or plants at areas where spraying is done.

17.6 **STANDARD**

All methods of termite protections used herein shall be in accordance with best standard practices of National Pest Control Association, U.S.A. and the British Wood Preserving Association.

17.7 **GUARANTEE**

The Contractor is to guarantee that the building shall be free from termite (white ants), wood bores and other pests or rodents which cause damage to wood or other organic material for 10 years from the date of acceptance of the building and that.

In the event of any damage caused within the guarantee period, the Contractor shall replace at his own cost such damaged material, finishes and affected portion thereof and suitably preserve and treat the entire premises with the best method known to the trade to prevent the spreading of termites.

CHIEF ENGINEER
K.P.T

17.8 **TESTING**

All materials and samples shall be subject to standard testing in accordance with the standards specified herein and shall be rejected if found below these standards. Rejected materials shall be removed from the site immediately.

17.9 **MEASUREMENT AND PAYMENT**

The item of work of termite proofing is given in BOQ on the basis of plinth area of the Buildings while it shall cover application of termite proofing to all bottoms and sides of pits, fill material, floor sub-grade and all the works requiring termite proofing in an area extending upto 3 metres outside the building line as elaborated in para 4 "Extent of Application" of these specifications.

ITEM - 18 TREES AND PLANTER AREAS

18.1 **SCOPE OF WORK**

The work covered under this section of specifications consists of preparation of ground, pits and trenches and providing and planting trees, shrubs and planter areas such that these are well grown at the time of completion of the project works.

18.2 **TYPES**

Shrubs and planters shall be of type that are well grown and blossoming in a short time but well suited to the area. Trees to be planted shall be of type suitable for growth in the area, capable of growing in a shorter time and to provide shades.

18.3 **TOP SOIL**

Top soil furnished from one source shall be typical sterile, soil obtained from well-drained area and possessing characteristics of representative soils in the project vicinity that produce vigorous plant growth. The top soil shall be free of sub-soil, brush, organic litter, objectionable weeds, clods, shale, large stones stumps, roots or other material 13mm in diameter or more, or any substance which might be harmful to plant growth or be a hindrance to grading, planting and maintenance operations.

18.4 **FERTILIZER**

The fertilizer shall be well decomposed organic manure which shall be subject to approval by the Engineer.

18.5 **PLANTING PITS FOR TREES AND SHRUBS**

Excavation for planting shall include plant pits and planting beds. The minimum depth of plant pits or beds shall be measured from finished grade.

Plant beds and pits shall be tested for drainage before planting by filling with water twice in succession. Conditions permitting the retention of water in planting beds or pits for more than 24 hours shall be brought to the attention of the Engineer.

If rock, underground construction obstruction, tree roots or other obstruction are encountered in the excavation of plant pits, alternate locations may be selected by the Engineer.

The Contractor shall review the applicable architectural or engineering drawings and shall be familiar with the alignment of utility lines, ducts and buried cables existing in the area. The Contractor shall field check the location of utilities shown on the drawings before any installation of material or plants. The Contractor shall be responsible for all damage resulting from any neglect or failure to comply with this requirements.

Following excavation of the planting pits, the pits shall be back filled with the sweet soil mixture as specified. Three days prior to planting, the pit shall then be filled with water for consolidation of the soil.

The dimension of the planting pits are as follows, unless specifically directed otherwise by the Engineer.

a) Trees 1m x 1m x 1m
b) Shrubs 600mm x 600mm x 600mm
c) Hedges Trenching 600 x 600 mm deep of required length.
d) Edges and flower beds: Fill the flower box with sweet soil as per drawings. For seasonal flowers, the beds are to have a minimum of 300 mm sweet soil and 150mm manure.

CHIEF ENGINEER
K.P.T

18.6 **SHRUBS AND PLANTER AREAS**

Should the existing grades be at the proposed elevations, the soil must be "trenched or plowed" 300mm deep over the entire surface. Should the soil be unsuitable, it must be removed and replaced with sweet soil.

Sweet soil shall be placed in the planter areas as shown on the drawings and raked. All stones in excess of 25mm in diameter and all rubbish shall be removed. Sweet soil not be spread in muddy state.

Sweet soil shall have minimum thickness of 300mm after natural settlement and light rolling, and shall conform to the finish grades and elevations shown in the plans. The finish grades shall be refined under the supervision of the Engineer.

Cover the sweet soil with 100mm of well decomposed organic manure and mix into the top 100mm of the top soil.

The prepared surface shall be free from all rivulets, crusting and caking. The sub-grade soil shall be scarified to a 300mm minimum depth and brought to a true and uniform grade before dumping and spreading of sweet soil.

18.7 **MAINTENANCE AND PROTECTION**

Maintenance by the Contractor shall begin immediately after the planting operation is completed and shall continue until acceptance. All replacement, adjustment and maintenance shall be done at no additional cost.

18.8 **CLEAN UP**

After completion of all work, all debris, rubbish and surplus material shall be removed from the site at the Contractor's expense. The site shall be left clean, presentable and to the satisfaction of the Engineer.

18.9 **MEASUREMENT AND PAYMENT**

Planter area shall be measured in square measure of the plan area covered and paid the rate per sq.meter in the B.O.Q.

Trees shall be measured in number and paid at the rate per number in the B.O.Q.

ITEM – 19 FOOT PATH AND PAVEMENT

Footpath and pavement shall be constructed with component parts as under:

Compacted fill to 95% compaction to required grades

150 mm thick compacted sand filling.

100 mm thick Lean concrete.

300 x 300 x 25 thick class-B concrete tiles laid with 2” inches joints which is to be filled either by sweet soil or shall be grouted with pebbles in approved patterns.

19.1 **MEASUREMENT AND PAYMENT**

Walkways to be measured in square measure between outer edges of pavement no separate measurement or payment to be made for component parts.

ITEM - 20 ALUMINIUM DOORS AND WINDOWS

20.1 SCOPE

This section of the technical specifications comprises the provision of all labour, materials and plant and performing all construction operations in connection with the erection and installation of all aluminum doors, windows, ventilators, fixed panels, with grills and glazing, etc, complete in every respect, including all related items required by the drawings and as specified herein or as directed. Materials and workmanship shall be the best of their kind and always above the minimum requirements of relevant British and/or American Standards. The standard of manufacture shall be ALCOP/KRUDDSON or equal as approved by the Engineer.

20.2 SHOP DRAWINGS

Before any work in connection with the windows and doors commences, the Contractor shall prepare shop drawings and specifications for all the windows and doors with all detail drawings showing fixings, details for materials and workmanship, etc,. necessary for their complete manufacture and installation. The Contractor after consulting the manufacturer shall submit the shop drawings and specifications to the Engineer for approval within a period of 20 days (minimum) prior to any commencing of work on the window or door lugs and fittings.

CHIEF ENGINEER
K.P.T

Shop drawings shall indicate elevations of windows and doors, full size sections, thickness and gauges of metal, proposed method of anchoring, the size and spacing of anchors, details of construction, method of glazing, method and materials for weather stripping when specifically required, and details of installation.

20.3 SITE MEASUREMENTS

Measurements in the knowledge of the Engineer shall be taken on the site as necessary to verify and supplement dimensions shown on the contract drawings.

20.4 SAMPLES

The Contractor shall submit samples of metal and materials of Engineer and his Representative for approval of finish and shall also submit manufacturer's literature describing all manufactured items. All materials used in the works shall be the best of its kind and at least equal in all respects to the samples approved.

20.5 MATERIALS

Extruded Sections

All extrusions are to be in accordance with B.S.1476 alloy HE9 with the mechanical properties of the WP condition unless required otherwise.

Sheet (Aluminium)

All aluminum sheet shall be to B.S.1470 alloy NS ¼ hard condition, unless required otherwise.

Anodizing All aluminum sections exposed to atmosphere shall be anodized in accordance with B.S. 3987 with a satin surface finish or other as required and approved. The average thickness of the anodic coating o a significant surface at the time of delivery shall not be less than 25 microns and at no point on the significant surface shall the measured thickness be less than 23 microns, or more than 30 microns. The method of testing shall be that described in Appendices, A,B and C of British Standard 3987.

Lacquer Finish to Anodized Aluminum

Unless directed otherwise all anodized aluminum shall be dipped one coat of methacrylate lacquer and stoved on at the works to a required temperature for a period of 20 minutes, the dry film thickness must be 12 microns minimum. Air drying sprayed coatings of lacquer or wax coatings and other removable protected methods will not be acceptable.

Steel

All steel fixing cleats, structural sections and steel cores which if required to be used to reinforce the aluminium windows or used in conjunction with the fixing, shall be hot dip galvanized in accordance with B.S.729: Part 1. Electro-galvanizing or metal spraying is not acceptable.

Neoprene Gaskets

The glazing shall be manufactured from neoprene to B.S.4255: Part 1, which covers performed rubber gaskets for weather exclusion from building, as approved by the Engineer.

Polystyrene Foam

The external aluminium windows and doors where required shall have expanded polystyrene foam (thermopore) picked into the hollow perimeter frame section to form a base for the mastic perimeter sealing.

Glazing

The glazing work shall be carried out according to the section "GLASS & GLAZING" and adhere to the recommended procedure of the window manufacture, to assure proper water tightness of the glazing and in any position where aluminium opening windows are used. They must be set strictly as the window manufacturer's instructions and British Standard Code of Practice C.P.152.

Fastening and fixing

All opening windows and doors are to be fitted with suitable opening, bolting at locking devices, catches and stays from the inside as necessary, with the best of their kinds as approved by the Engineer.

CHIEF ENGINEER
K.P.T

Grills

All grills shall be of approved material, shape and design as shown on the drawings or as directed, where required.

Aluminium Wire Net

Aluminium wire net shall be provided for mosquito proofing as approved on all openable windows and elsewhere, unless not required, as shown on the drawings.

20.6 DESIGN

All the external windows and doors must be designed always subjected to the approval of the Engineer to meet the following conditions:

i) The wind load for design purposes to be a maximum of 100 kg per square metre.
ii) The provision for expansion and contraction for the temperature range of 50^{o}C to 0^{o}C.
iii) The design must accept single thickness of tinted or float glass or alternatively,
iv) All glazing is to be neoprene channel gaskets with vulcanized corners and fixed with spring beads.
v) Mastic perimeter sealing and at joints between adjacent frames shall be with polysulphide in accordance with B.S.4254.
vi) The finished doors and windows shall be free from all sharp edges, burrs and the like that might be a hazard to the user.
vii) It shall not be possible for a panel or leaf to become accidentally disengaged from the outer frame.
viii) On all finished doors and windows means shall be provided to prevent injury to the user's hand where the end grip may meet or pass close to another panel during operation.

20.7 DELIVERY AND PROTECTION

Delivery

Windows and doors are to be delivered to the site complete with fittings and fixings. The Contractor shall install, clean down and protect the windows and doors against further building work under the direction and supervision of the Engineer and to his complete satisfaction.

Protection of Aluminium from Dissimilar Materials

Where aluminium windows and doors come into contact with block work, steelwork, concrete or plaster, they shall be coated with an insulating lacquer, paint or tape, to ensure that electro-chemical corrosion is avoided.

20.8 INSTALLATION OF WINDOWS AND DOORS

General

Doors and windows shall be installed and adjusted by experienced workmen. They shall be installed, without forcing, into prepared opening unless detailed or specified otherwise in accordance with manufacturer's instructions and the approved shop drawings and set at the proper elevation and location in level and in alignment with properly braced frames to prevent distortion and misalignment.

Anchors and Fastenings

Anchor all the units to masonry, or to other or adjacent construction as shown on details and the approved shop drawings. Where windows are set in prepared openings, place the necessary anchorage during progress of wall construction. Anchors and fastenings shall be built into anchored, or bolted to the jambs of openings, and shall be fastened securely to the windows or frames and to the adjoining construction. Unless otherwise detailed, anchors shall be spaced not more than 45 cm apart on heads, jambs and sills. All anchors shall have sufficient strength to hold the member firmly in position.

Protection

Care shall be taken in handling windows and doors during transportation and at site. Doors and windows shall be stored upright on pieces of timber in a dry location, and under cover. After installation, protect windows and doors frame damage during subsequent construction activities.

Cleaning

Surfaces of windows and doors shall be cleaned on both the inside and outside of all mortar, plaster, paint and other foreign matter to present a neat appearance and prevent fouling of weathering surfaces and weather-stripping. In addition, windows shall be washed off with a stiff-fibre brush, soap and water, and thoroughly rinsed with clean water. Where windows and doors have

CHIEF ENGINEER
K.P.T

become stained or discoloured they shall be cleaned or have finish restored in accordance with recommendations of the manufacturers. Stained, discoloured, or abraded windows that cannot be satisfactorily repaired shall be replaced with new windows at the Contractor's expense.

20.9 FIXED GLAZED PANELS

Wherever required fixed glazing shall be installed. This shall contain ventilator grills on area, capable of being opened, and being integrated within the anodized aluminium frame work in which the glazing will be fixed. The Contractor shall submit shop drawings obtained from the manufacturers (marked in English) and submit these to the Engineer for approval of the design.

20.10 SPECIAL DOORS

Glazed double swing self-closing doors wherever required or as shown in the drawings shall be of a type and design and for which prior approval of the Engineer shall be obtained by the Contractor.

20.11 MEASUREMENT AND PAYMENT

The doors, windows and ventilators shall be measured net between the outer edges of the aluminium frames and paid for at the unit rates entered in the Bill of Quantities and in accordance with the Conditions of Contract. Unit rates for doors, windows, ventilators shall be inclusive of all materials, labour, etc including anodizing, netting, fittings, fixtures and glazing, etc complete covering any other items incidental thereto.

CHIEF ENGINEER
K.P.T

SPECIAL STIPULATIONS

Clause

Conditions of Contract

1.	Engineer's Authority to issue Variation in emergency	2.1	5% of the Contract Price stated in the Letter of Acceptance.
2.	Amount of Performance Security	10.1	10% of Contract Price stated in the Letter of Acceptance.
3.	Time for Furnishing Programme	14.1	Within 28 days from the date of receipt of Letter of Acceptance.
4.	Minimum amount of Third Party Insurance	23.2	Rs. 1.0 (M) per occurrence with number of occurrences unlimited.
5.	Time for Commencement	41.1	Within 14 days from the date of receipt of Engineer's Notice to Commence which shall be issued within fourteen (14) days after signing of Contract Agreement.
6.	Time for Completion	43.1, 48.2	8 Months from the date of receipt of Engineer's Notice to Commence.
7.	a) Amount of Liquidated Damages	47.1	Rs. **26,370** for each day of delay in completion of the Works subject to a maximum of 10% of Contract Price stated in the Letter of Acceptance.
	b) Amount of Bonus	47.3	Rs. _____for each day the Works are completed before the specifiedd completion date of the Works subject to a maximum of ___% of Contract Price stated in the Letter of Acceptance. Deleted
8.	Defects Liability Period	49.1	365 days from the effective date of Taking Over Certificate.
9.	Percentage of Retention Money	60.2	10 % of the amount of Interim Certificate until the amount so retained reaches the limit of Retention Money.
10.	Limit of Retention Money	60.2	5 % of Contract Price stated in the Letter of Acceptance and will be released upon issuance of Taking Over Certificate.
11.	Minimum amount of Interim Payment Certificates (Running Bills)	60.2	The Minimum amount of IPC Rs._____Million.
12	Time of Payment from delivery of Engineer's Interim Payment Certificate to the Employer.	60.10	Minimum 60 days in case of local currency or.

* **Delete if alternative one is not adopted.**

CHIEF ENGINEER
K.P.T

ELIGIBILITY CRITERIA

FOR CONTRACTOR – IV

CHIEF ENGINEER
K.P.T

KARACHI PORT TRUST

ENGINEERING DEPARTMENT

APPOINTMENT OF CONTRACTOR

1. Proposals are invited from reputed Consultancy firms for "**Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Storm Water Drain Line At Lalazar Area".**
2. Technical and Financial proposals in Single sealed envelopes with following particulars/information should reach the Chief Engineer KPT, duly marked "Technical / Financial Proposals" latest by _____

   a) Name of firm (s) with relevant particulars of organization set up and experience.

   b) Registration of firm with PEC.

   c) Length of total experience and details of completed and ongoing projects of similar nature.

   d) Bio data of key personnel/experts with details of related experience of the individuals.

   e) Details of arbitration proceedings with client, if any, that may affect performance of the firm.

   f) Karachi Port Trust reserves the right to reject any or all Bids at any time prior to the acceptance of a Bid or proposal, KPT shall upon request to any supplier or contractor who submitted a bid or proposal, the grounds for its rejection but is not required to justify those grounds.

CHIEF ENGINEER
K.P.T

TERMS OF REFERENCE.

SUB:- Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Storm Water Drain Line At Lalazar Area

1. The Karachi Port Trust intends to appoint a reputed Contractor firm for the Feasibility Study Design and Supervision for the **Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Storm Water Drain Line At Lalazar Area.".**

2. The obligations of the Contractor are briefly outlined here under:-

2.1 **Part-I (Construction Supervision)**

The Contractor will be truly responsible for the following:

a. Detailed Supervision of the work through experienced, qualified Graduate Engineers and other supervisory staff having sufficient experience who will perform their duties with duel diligence.

b. Ensure, (through out the supervision phase), the work is in strict compliance with the construction design and drawing, contract specifications, contract agreement, quality management plan, safety provision, detail software based report.

c. Maintain.

- Equipped site office provided by the Contractor.
- Records, (Inspection reports, progress reports, tests reports) and same will be submitted to client on fortnightly basis or as and when demanded.

d. Furnish detail final inspection report, a month before the expiry of maintenance period.

e. Pointing out defects and their remedies to remove the defects.

f. Clarify that Construction material brought at site is in accordance with specifications, and got tested as per standard practice defined in specification and code of practice. Check progress of project in accordance with approved schedule, and offer suggestions for further improvement

g. Issuance of handling / taking over certificates after detail final inspection, as and when project completed.

h. Monitor, performance of the structure, with respect to its intended use, and also under take the progress of defects to be attended during the defect liability period, after completion of the project.

i. Propose maintenance strategy after completion of subjected nature works.

j. Detail final inspection of the project and will recommend client for approval before issuance of Defect Liability Certificates.

CHIEF ENGINEER
K.P.T

A. Scope of Work:

1. The Karachi Port Trust intends to appoint a reputed Contractor firm for the "**Maintenance / Repair And Road Patch Work At Various Locations & Laying Of Storm Water Drain Line At Lalazar Area.**".

The services to be provided for the Maintenance / Repair is I accordance to the KPT Press advertisement dated _____.

B. Minimum Site Supervision Staff Required:

- One (01) Resident Engineer.
- One (01) Supervisors (DAE) Civil.

C. Proposal Evaluation:

i. On receipt of the proposals, client will appoint a suitably qualified committee to evaluate the Technical Proposals of all the Contestants. The Committee will Evaluate each Technical Proposal as regards the understanding of the project needs, Methodology, Works Plan, Time Schedule, Experience and Qualifications of the personnel to be assigned, present work load and other pertinent aspects in relation to the services required of the Contracting firm. The Committee will rank the Contracting firms in order of their suitability for the particular Project.

ii. The client will then open the Financial Proposals of all the Technically Qualified firms / Contracting firms in the presence of such Contracting firms who care to be present and will publicly announce the prices and terms of all proposals.

iii. Financial Proposals of the short listed eligible Contracting Firms will only be opened.

D. Award of Contract:

LEAST COST METHOD The Contract will be awarded to the Firm whose bid found to be the most advantageous with 70% Weightage be given to Technical Proposal and 30% Weightage given to Financial Bid. Financial Bid will be evaluated on the formula given below.

DELETED

Financial Score = [illegible] Amount of Lowest submitted Bid

Amount quoted by bidder

E. Currency of Payment:

Payment for all the services will be made in Pak. Rupees.

CHIEF ENGINEER
K.P.T

Eligibility Criteria:

S. No.	Category	criteria
1.	Experience	Mandatory
2.	Personnel	Mandatory
3.	Valid PEC Registration Certificate	Mandatory
4.	Financial Criteria	Mandatory

Cont-

CHIEF ENGINEER
K.P.T

Annexure-I

Eligibility Criteria

S.No.	Attribute	Criteria
1) Experience		
a.	Having completed/ongoing atleast 01 sizeable Construction Project of worth 10 (M) related to Civil Works in last 10 years.	Mandatory
2) Personnel Capability		
i.	Site Engineer	BE Civil having experience of at least 07 years and have supervised at least 01 project with comparable scope of work. **Mandatory**
ii.	Site Supervisor	DAE Civil having experience of at least 05 years and have supervised at least 01 projects with comparable scope of work. **Mandatory**
3)	**Valid PEC Registration**	duly licensed by the Pakistan Engineering Council (PEC) in category C-5 or above having specialization in CE-09 & CE-10 category. **Mandatory**
4)	**(Detail of Arbitration, Litigation, Blacklisting default if any)** Certificate in respect that firm has never been indulged / involved in any Corrupt, Fraudulent or Collusive Practices nor Black Listed & involved in any Litigation / Arbitration. (E-Stamp of Rs.500/-)	**Mandatory**
5) **Financial Criteria:**		
	In case of companies and firms, last three year Audited Financial Statement are to be provided showing minimum average turnover of Rs. 15 Million. In case of individuals / Sole Proprietors, last three year tax returns filed with FBR are to be provided showing minimum turnover of Rs. 15 Million on average.	**Mandatory**

CHIEF ENGINEER
K.P.T

SPECIFICATIONS

CHIEF ENGINEER
K.P.T

STAKE-OUT SURVEY

1. SCOPE

The work to be done under this item the Contractor shall make the stakeout survey for construction purposes with competently qualified men, consistent with the current practices. The work shall proceed immediately upon the award of the Contract and shall be expeditiously progressed to completion in a manner and at a rate satisfactory to the Engineer. The Contractor shall keep the Engineer fully informed as to the progress of the stakeout survey. The scope of this section of specifications is covered by detailed specifications as laid down herein.

2. MATERIAL AND EQUIPMENT

All instruments, equipment, stakes and other material necessary to perform all work shall be provided by the Contractor. These instruments and equipment shall be available to Engineer at all times for the purpose of checking the work of the Contract.

All stakes used shall be of a type approved by the Engineer, clearly and permanently marked so as to be legible at all times. It shall be the Contractor's responsibility to maintain these stakes in their proper position and location at all times. Any existing stakes or markers defining property lines and survey monuments which may be disturbed during construction shall be properly tied into fixed reference point before being disturbed and accurately reset in their proper position upon completion of the work.

3. CONSTRUCTION

The Contractor shall trim trees, bushes and other interfering objects, not consistent with the plan, from survey lines in advance of all survey work to permit accurate and unimpeded work by his stake-out survey crews and the Engineer's survey crews. The exact position of all work shall be established from control points, which are shown on the plans or modified by the Engineer. Any error, apparent discrepancy in or absence of data shown or required for accurately accomplishing the stakeout survey shall be referred to the Engineer for interpretation or furnishing when such is observed or required.

The Contractor shall be responsible for the accuracy of his work and shall maintain all reference points, stakes, etc. throughout the life of the Contract. Damaged, destroyed or inaccessible reference points, bench marks or stakes shall be replaced by the Contractor. Existing or new control points that will be or are destroyed during construction shall be re- established and all reference ties recorded thereon shall be furnished to the Engineer. All stakeout survey work shall be referenced to the centerlines shown on the Plans. All computations necessary to establish the exact position of the work from control points shall be made and preserved by the Contractor. All computations, survey notes and other records necessary to accomplish the work shall be kept neatly and made available to the Engineer upon request and furnished to the Employer upon Contract completion.

CHIEF ENGINEER
K.P.T

The Engineer may check all or any portion of the stakeout survey work or notes made by the Contractor and any necessary correction to the work shall be immediately made. Such checking by the Engineer shall not relieve the Contractor of any of his responsibilities for the accuracy or completeness of his work.

Reference points, baselines, stakes and benchmarks for borrow pits shall be established by the Contractor.

All required right-of-way and easement limits shall be established, staked and referenced by the Contractor concurrent with the construction stakeout survey.

The Contractor shall place at least two offset stakes or references at each center lines station and at such intermediate stations as the Engineer may direct. From computations and measurements made by the Contractor, these stakes shall be clearly marked with the correct center line, station number, offset and cut or fill so as to permit the establishment of the true center line location during construction. He shall locate and place all cut, fill, slope, line grade or other stakes and points as the Engineer may direct to be necessary for the proper progress of the work.

4. MEASUREMENT AND PAYMENT

No payment shall be made for the works involved within the scope of this section of specifications unless otherwise specifically stated in the Bill of Quantities or herein. The cost thereof shall be deemed to have been included in the quoted unit rate of other items of the Bill of Quantities.

CHIEF ENGINEER
K.P.T

CLEARING AND GRUBBING

1. SCOPE

The work to be done under this section of the specification includes furnishing all plant, labour, equipment, appliances for performing all operations required in connection for clearing the designated area of all trees, down timber, snags, bush, other vegetation, rubbish and all other objectionable material, and shall include grubbing stumps, roots, and matted roots, and disposal of all spoil material resulting from the clearing and grubbing. It shall also include the removal and disposal of structures that protrude, encroach upon, or otherwise obstruct the work, except when otherwise provided for on the plans or as directed by the Engineer to be saved. The scope of this section of specifications is covered with detailed specifications as laid down herein.

2. LIMIT OF AREA

2.1 Location of Works

The Engineer will define the limit of areas where clearing and grubbing is to be done. Normally it will include all land within the right of way and all other construction area including ditches, detours, minor road crossings and other areas shown on the plans or as specified or as directed by the Engineer. The Engineer will designate the fences, structures and debris and trees and bushesto be cleared where grubbing is not required. It shall not include clearing and grubbing of borrow or other pit areas from which material is secured. It shall include the leveling or removal of all bunds or mounds within the right of way unless otherwise directed by the Engineer.

2.2 Grubbing and Cutting

All plants, trees, bushes including roots and stumps within the limits of the site shall be grubbed and excavated unless otherwise specified or approved by the Engineer.

2.3 Disposal

All wood and bush shall be removed or otherwise disposed off within fifteen (15) days after cutting or felling unless otherwise approved. No tree trunks, stumps or other debris shall be left within Site unless approved in writing by the Engineer. The location of disposal areas shall be within or outside the limits of the project or as approved in writing by the Engineer and shall be acquired by the Contractor at his own expense. Any useable material shall remain the property of the Employer.

2.4 Protection and Restoration

The Contractor shall prevent all damage to pipes, conduits, wires, cables or structures above or below ground. No land monuments, property markers, or official datum points shall be damaged or removed until the Engineer has witnessed or otherwise referred their location and approved their removal. The Contractor shall so control his operations as to prevent damage to trees and shrubs, which are to be preserved. Protection may include fences and boards lashed to trees to prevent damage from machine operations. The Contractor shall protect the environmental interests / conditions of the areas of camp and

CHIEF ENGINEER
K.P.T

work site. The existing covered or open benchmarks should be relocated as directed by the Engineer. In the event that anything specified herein to be saved and protected is damaged by the Contractor; such damages shall immediately be repaired or replaced by the Contractor at his own cost to the satisfaction of the Engineer. All areas cleared and grubbed must be approved by the Engineeror Engineer's Representative before the start of cleaning operations.

3. MEASUREMENT AND PAYMENT

No payment shall be made for the Works involved within the scope of this Section of Specifications unless otherwise specifically stated in the Bills of Quantities or herein.

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

CHIEF ENGINEER
K.P.T

STRIPPING OF TOP SOIL

1. SCOPE

The work under this section of the specifications shall consist of furnishing all plant, labour and equipment and performing all operations in connection with stripping of top soil, removal and disposal of unsuitable and surplus material in accordance with the specification and the lines, grades and levels as shown on the drawings or as directed by the Engineer.

2. EXECUTION

The Contractor shall jointly survey the area designated by the Engineer and prepare the survey drawings showing pre work levels and cross-section and submit to the Engineer for approval prior to start of any stripping of top soil.

All suitable material from stripping of top soil shall be transported to and placed in fill areas or stock piled as directed by the Engineer. All material declared by the Engineer as unsuitable or surplus shall be removed from the site and disposed off to areas as designated by the Engineer.

The Contractor shall carryout the stripping of top soil upto 150mm in areas designated on the drawings or as directed by the Engineer. Any area which shall be stripped to thickness more than specified shall be approved by the Engineer prior to the start of the work. All related drawings shall be submitted for the approval of the Engineer before stripping operations are started. Over stripping unless otherwise directed shall not be acceptable and the Contractor shall backfill to the required levels and grades and compact to 95% of maximum dry density as determined by ASTM D 1557 at his own expense.

The finished grade surface shall be smooth and even and tolerance from required grade shall not be more than 25mm.

3. MEASUREMENT AND PAYMENT

No payment shall be made for the Works involved within the scope of this Section of Specifications unless otherwise specifically stated in the Bills of Quantities or herein.

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

CHIEF ENGINEER
K.P.T

LEVELLING AND GRADING

01. SCOPE

1.1 The work to be done under this section of the specifications consists of performing all earth work required for levelling & grading the area in accordance with required levels, elevations and grades shown on the Drawing/Plans or as established by the Engineer. The work to be done by the Contractor shall include performing the required cutting to line, levels, grade and filling the area to the desired levels and grades; providing and transporting labour, excavating, grading, levelling, and watering and all incidental operations required in performing the work as specified herein.

1.2 Levelling and grading work shall be performed after completing the clearing and grubbing.

1.3 During the progress of the works, if by reason of delay, effects of bad weather; rainfall, or from any cause whatsoever, any levels, grades or profiles of the area are changed, the Contractor shall, at his own cost, be liable to bring the area to the required levels and profiles as shown on the Drawings or as directed by the Engineer.

1.4 Prior to commencement of work the Contractor shall submit for approval of the Engineer complete proposal with regard to methodology to be adopted for cut and fill for levelling and grading works contractor should give due consideration to the site configuration and the required levels and lines shown on the drawing.

02. APPLICABLE STANDARDS

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

ASTM D 422	Particle size analysis
ASTM D 4318	Test for liquid & Plastic Limit
ASTM D 1556, 1557 & 2167	Compaction

03. GENERAL

3.1 The Contractor shall submit a detailed list of plant and equipment which he shall undertake to bring to the site and to carry out the work. The list shall satisfy the Engineer as to type, size and quantity.

3.2 The Contractor shall jointly survey the Project area marked on the drawings or any area designated by the Engineer and prepare the survey drawings showing pre work levels of natural ground profile and cross-sections and submit to the Engineer for approval prior to start of any leveling and grading operation. Clearing grubbing shall be done in accordance with the provision of related specification section.

3.3 Existing utilities which are to remain in service or to be relocated and to remain in service until relocation, are to be determined by the Contractor.

04. The select material from cut/excavations shall be transported to and placed in fill areas or stockpiled at locations designated by the Engineer.

CHIEF ENGINEER
K.P.T

05. SITE PREPARATION

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

4.2 The Contractor shall construct and maintain accurate bench marks so that the lines and

4.3 levels can be easily checked by the Engineer.

4.4 Levelling and grading of the designated area shall be done by means of levelling equipment and grading machines. The Contractor shall be responsible for the required construction and stability of the grades in conformity with the Drawings/Plans or as determined by the Engineer.

06. CUT

5.1 Classifications of Cut

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

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

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

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

The Contractor shall build, maintain and operate all berms, channels, flumes, sumps and other temporary diversion and protection works needed to divert the surface water through or around the required excavation.

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

Submission for review and comments of the required plans and sketches and anyapproval from Engineershall not relieve the Contractor of any of his/ her duties and obligations under the Contract.

CHIEF ENGINEER
K.P.T

5.2 Tolerance

The surface shall be of smoothness that will not vary more than 50mm from true grade as shown on drawings and decided by the Engineer.

5.3 Extra Cut/Excavation

In the event the Contractor cuts/excavates any area to a level lower than the required, he shall re-instate such areas to the required density levels and grades. No extra payment will be made to the Contractor on this account.

07. FILL

6.1 Fill Materials

Areas requiring filling shall be filled with select material obtained from the required cut / excavations. The fill material shall be free from objectionable material and to the satisfaction of the Engineer. The gaps between the rock fragments shall be filled with finer material. The earthwork by rock fragments should be kept at lower part of the fill and size of these fragments shall not be larger than 0.06 cu.m. The location of rock fragment dumping shall be subject to the approval of the Engineer.

The Contractor shall not place fill material during periods of rain.

6.2 Haul

All hauling will be considered a necessary and incidental part of the work.

6.3 Tolerances

Finished surface shall be smooth and even and shall not vary more than 50 mm from elevations/ true grade as shown on drawings.

08. QUALITY CONTROL

Field inspection will be carried out jointly by the contractor and the Engineer. Contractor shall facilitate the inspection and the performance of tests and bear all costs thereof. A copy of all test shall be submitted to the Engineer for approval. Tests shall be performed for each type of the material encountered during excavation in accordance with ASTM D-422 for selecting the material at various fill locations.

09. MEASUREMENT AND PAYMENT

8.1 General

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

8.1.1 Any fill with approved material necessitated by over cut/excavation due to fault or convenience of the contractor.

8.1.2 Stock piling of the cut/excavated select material at approved locations within project boundary and transporting back the same to places requiring fill.

8.1.3 Laboratory and field tests stipulated in these specifications.

8.1.4 Disposal of surplus cut material within 05 kilometers free haulage limit along the most direct route from the boundary of the project.

8.1.5 Transporting approved select fill material from within the project boundary.

8.1.6 Levelling, grading and spreading of cut & fill of soil/rock.

8.2 Levelling and Grading by 'Cutting'

CHIEF ENGINEER
K.P.T

8.2.1 Measurement

Measurement of acceptably completed works of levelling and grading by cutting will be made on the basis of net actual volume of 'cut' as per BOQ in accordance with the line level and grade shown on the drawings or as directed by the Engineer.

Quantities of cutting shall be calculated / measured for payment purposes from the pre-work levels and the levels shown on the drawings.

8.2.2 Payment

Payment will be made for acceptable measured quantity as provided above of levelling and grading in 'cut' on the basis of unit rate as per BOQ quoted in the Bill of Quantities and shall constitute full compensation of all the works related to the item.

8.3 Levelling & Grading by 'Filling'

8.3.1 Measurement

Measurement of acceptably completed works of levelling and grading by 'Filling' will be made on the basis of net actual volume as per BOQ of compacted 'Fill' in accordance with the lines levels and grade as shown on the drawings as directed by the Engineer.

Quantities of 'Filling' shall be calculated / measured for payment purposes from the pre-work levels and the levels shown on the drawings.

8.3.2 Payment

Payment will be made for acceptable measured quantity of levelling and grading in 'Filling' on the basis of unit rate as per BOQ quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

CHIEF ENGINEER
K.P.T

DEMOLISHING & DISMANTLING WORKS

1. SCOPE

The work covered by this Section of the Specifications consists of furnishing all plant, labour, equipment, appliances and performing all operations in connection with demolition/ dismantling and removal of existing sheds, jetty structures, asphalt road, pavement, kerbs, medians, foundations, stone pitching, approaches/plate forms,buildings, trees, plants, removal of services with accessories and rail tracks, sleeper, embankments, stone ballast, plain & reinforced concrete and concrete/ block masonry structures including disposal of demolished/ dismantled and removed material to designated places. Whole work shall be done in accordance with these specifications and as directed by the Engineer.

2. GENERAL REQUIREMENTS

2.1 The work includes demolition, salvage of identified items and materials, and removal of resulting rubbish and debris. Rubbish and debris shall be removed , unless otherwise directed . Materials that cannot be removed daily shall be stored in areas specified by the Engineer. In the interest of conservation, salvage shall be pursued to the maximum extent possible. The usable/salvaged material shall become the property of the Employer.

2.2 All existing structures and utilities obstructing the construction shall be demolished. For further details and extent of demolition work refer to drawings.

3. SUBMITTALS

The procedures proposed for the accomplishment of the work.

The procedures shall provide for safe conduct of the work, including procedures and methods to provide necessary supports, lateral bracing and shoring when required,careful removal and disposition of materials specified to be salvaged, protection ofproperty which is to remain undisturbed, coordination with other work in progress, and timely disconnection of utility services. The procedures shall include a detailed description of the methods and equipment to be used for each operation, and thesequence of operations.

4. DUST CONTROL

The amount of dust resulting from demolition shall be controlled to prevent the spread of dust to occupied portions of the construction site and to avoid creation of a nuisance in the surrounding area. Use of water will not be permitted when it could result in, or create, hazardous or objectionable conditions such as ice, flooding and pollution.

5. PROTECTION

5.1 Protection of Personnel

5.1.1 During the demolition work the Contractor shall continuously evaluate the condition of the structure being demolished and take immediate action to protect all personnel working in and around the demolition site. No area, section, or component of floors, roofs, walls, columns, pilasters, or other structural element will be allowed to be left standing without sufficient bracing, shoring, or lateral support to prevent collapse or failure while workmen remove debris or perform other work in the immediate area.

CHIEF ENGINEER
K.P.T

5.1.2 Floors, roofs, walls, columns, pilasters, and other structural components that are designed and constructed to stand without lateral support or shoring, and are determined to be in stable condition, may be allowed to remain standing without additional bracing, shoring, of lateral support until demolished. The Contractor shall ensure that no elements determined to be unstable are left unsupported and shall be responsible for placing and securing bracing, shoring, or lateral supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

5.2 Protection of Existing Property

Before beginning any demolition work, the Contractor shall survey the site and examine the drawings and specifications to determine the extent of the work. The Contractor shall take necessary precautions to avoid damage to existing items to remain in place, to be reused, or to remain the property of the User; any damaged items shall be repaired or replaced as approved by the Engineer. The Contractor shall coordinate the work of this section with all other work and shall construct and maintain shoring, bracing, and supports as required. The Contractor shall ensure that structural elements are not overloaded and shall be responsible for increasing structural supports or adding new supports as may be required as a result of any cutting, removal, or demolition work performed under this contract.

5.3 Protection From the Weather

The usable and salvageable materials shall be protected from the weather at all times handing over to the Employer.

5.4 Protection of Trees

Trees within the project site which might be damaged during demolition and which are indicated to be left in place shall be protected by a 1.83 m high fence. The fence shall be securely erected a minimum of 1.5 m from the trunk of individual trees or follow the outer perimeter of branches or clumps of trees. Any tree designated to remain that is damaged during the work under this contract shall be replaced in kind or as approved by the Engineer.

6. BURNING

The use of burning at the project site for the disposal of refuse and debris shall not be permitted.

7. USE OF EXPLOSIVE

Use of explosives shall not be permitted.

8. PROCEDURES

8.1 The Engineer will define the limits where demolition/ dismantling and removal activity is to be done and shall approve the procedures/ methods to be adopted by the Contractor. The Contractor shall layout the boundaries/ limits for Engineer's checking and approval before commencing dismantling work.

8.2 Whole work shall be performed in an orderly manner and the Contractor shall take all necessary precautions and expedients to prevent damages to the adjacent structures, installed equipment/ machinery, pipes, conduits, any other installation etc. Any damage caused to the structures and installations due to negligence of the Contractor during demolition/ dismantled and removal operations shall be repaired/ replaced by the Contractor at his cost and to the satisfaction of the Engineer.

CHIEF ENGINEER
K.P.T

9. DEMOLITION OF SHEDS, STRUCTURES, ROAD, PAVEMENTS AND RAILWAY TRACKS, MASONRY WORKS, BUILDINGS AND PLAIN/ REINFORCED CONCRETE

The Contractor shall demolish sheds, structures, road pavements , railway tracks,masonry / flooring works, stone pitching, buildings and plain/ reinforced concrete works tothe line and depth as shown on the Drawings or as directed by the Engineer. Explosives shall not be used to remove the plain and reinforced cement concrete or any other material whatsoever. Mechanically operated breakers, concrete saws, chipping hammers or other approved methods shall be employed for cutting. Care shall be taken that existing services and structures are not damaged. It shall be the responsibility of the Contractor to replace at his cost any services and structures damaged by the Contractor due to his negligence during cutting operations or thereafter until the whole of cut parts/ areas are restored to original condition to the satisfaction of the Engineer.

10. CLEARANCE OF GREEN AREA

The bushes/ plants in existing green area shall be cleared off up to the roots and the surface shall smoothen and cleared from all debris and any organic material before receiving new layer.

11. REMOVAL OF EXISTING SERVICES/ UTILITIES

The Contractor shall mark all the services/ utilities falling within the ROW. After getting approval from the Engineer, the Contractor shall remove all such services/ utilities as per the requirement/ specifications of the relative department whose utilities/ services are being removed/ shifted.

12. DISPOSAL OF MATERIAL

12.1 All debris, materials resulting from demolition/dismantling works shall be disposed off within 20 Km places designated by the Engineer in the manner of disposition required and directed by the Engineer.

13.2 Unsalvageable Material

Concrete, masonry, and other noncombustible material, shall be disposed off thesite.

13.3 All salvaged/ useable materials resulting from demolition and removal shall remain the property of the Employer and shall be stacked at designated places.

13.4 The Contractor shall segregate the useable materials as directed by the Engineerand stack at designated places.

14. CLEAN UP

Debris and rubbish shall be removed from site. Debris shall be removed and transported in a manner that prevents spillage on streets or adjacent areas. Local regulations regarding hauling and disposal shall apply.

All debris materials resulting from demolition / dismantling works shall be disposed off to places designated by the Engineer in the manner of disposition required and directed by the Engineer.

15. MEASUREMENT AND PAYMENT

15.1 General

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

CHIEF ENGINEER
K.P.T

15.1.1 Safety measures for adjacent infra structure and facilities.

15.1.2 Temporary diversion and safety measures, demarcation / layouts etc.

15.1.3 Loading, unloading, transportation, disposal and stacking of all demolished/ dismantled/ removed material within free haulage limit of 5Km measured along the most direct route from the boundary of the project or to the place as designated by the Engineer.

15.1.4 Loading, unloading, transportation and stacking of all usable material to the place as designated by the Engineer.

15.1.5 Permissions/ approvals, if required, from the relative department and information to the stack holders.

15.1.6 Earth work

15.1.7 hessian cloth, plaster of paris etc

15.1.8 Repair / finishing of adjacent component of dismantled structure.

15.2 Existing Boundary Wall

15.2.1 Measurement

Measurement for acceptably completed demolition and removal of existing boundary wall/ Structure will be made on the basis of actual area in square meter of the boundary wall / structure and its foundation / sub-structures dismantled as shown in drawing and as directed by the Engineer.

15.2.2 Payment

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

Existing Railway Tracks

15.2.3 Measurement

Measurement for acceptably completed works of cutting, dismantling and removal of existing railway track including steel rails, wooden/ concrete sleepers, stone and sand ballast etc. will be made on the basis ofnumber of running meter of the railway track dismantled as shown in drawing and as directed by the Engineer.

15.2.4 Payment

Payment will be made for acceptable measured quantity of dismantled and removed railway track including steel rails, wooden/ concrete sleepers, stone and sand ballast etc. on the basis of unit rate per running meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

CHIEF ENGINEER
K.P.T

15.3 Demolition / Dismantling/ Removing of Concrete Paving Block/ Pavement structure

15.3.1 Measurement

Measurement for acceptably completed demolition / dismantling / removing of existing concrete paving bock/ pavement structure will be made on the basis of actual area in square meter dismantled as shownin drawing and as directed by the Engineer.

15.3.2 Payment

Payment will be made for acceptable measured quantity of demolition / dismantling / removing of existing concrete paving bock/ pavement structure on the basis of unit rate per square meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

15.4 Removing/ Demolition/ Dismantling/ Existing Asphalt Pavement

15.4.1 Measurement

Measurement for acceptably completed removing/demolition/ dismantlingof existing asphalt pavement structure including asphalt area, base sub- base concrete will be made on the basis of actual area in square meter dismantled as shown in drawing and as directed by the Engineer.

15.4.2 Payment

Payment will be made for acceptable measured quantity of removing/demolition/ dismantling of existing asphalt pavement structure including base and sub-base course on the basis of unit rate per square meter quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

15.5 Demolition/ Dismantling/ Removing of Existing Buildings/ Structure/ sheds/ Gates/ Steel Boat Jetty and Raised platform

15.5.1 Measurement

Demolition of existing buildings/ structures/ sheds/ Gates/ Steel Boat Jetty and raised platform as mentioned in the Bill of Quantities will be made on the basis of job actually dismantled/ demolished, as shown on the Drawings or as directed by the Engineer.

15.5.2 Payment

Payment will be made for acceptable completed dismantling/ demolition of existing building/ structures/ sheds/ Gates/ Steel Boat Jetty and raised platform on the basis of unit rate per job quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the item.

CHIEF ENGINEER
K.P.T

UNPLASTICISED POLYVINYL CHLORIDE (uPVC)PIPES AND PIPE FITTINGS (SEWER/GRAVITY)

1.0 SCOPE OF WORK

The work covered by this section of the specifications consists of furnishing all uPVC pipes, plant, labour, equipment, appliances and materials and in performing all operations required for installing and testing of sewer pipes in strict accordance with the specifications of this section and applicable drawings and subject to the terms and conditions of the contract.

2.0 APPLICABLE CODES AND STANDARDS

All works and materials under this section shall conform to the latest edition of the following applicable codes and standards. When the requirements of this specifications or the drawings exceed the code requirements, the Contractor shall be bound by the specifications and/or drawings for that requirements.

Number	Title
B.S. 2494	"Materials for Elastomeric Joint Rings for Pipeworks and Pipelines"
B.S. 4346	"Joints and Fittings with Unplasticised PVC Pressure Pipes"
B.S. 3505	"Unplasticised PVC Pipe for Cold Water Services"

Other authoritative codes and standards which ensure equal or higher quality then those references may also be acceptable subject to satisfaction and approval of the Engineer.

Any conflict between the requirements of this specification and those on the figures herein or in the codes, standards and specifications referred to herein shall be brought to the attention of the Engineer for resolution whose decision will be final and binding.

3.0 GENERAL REQUIREMENTS

3.1 Pipes shall be new and unused.

3.2 Where manufacturers of pipes are specified, they shall be of the same manufacturersunless otherwise approved by the Engineer.

3.3 Where more than one similar item of pipes are specified, they shall be of the same manufacturer.

3.4 The Contractor shall submit to the Engineer for approval the following informationregarding the specified/proposed items of pipes and fittings.

(i) Name and address of the manufacturers
(ii) Country of origin, make and model
(iii) Dimensions and wall thicknesses of pipes
(iv) MTC - mill test certificate from the manufacturers
(v) Method of jointing, testing and commissioning

3.5 Approval by the Engineer shall not be construed as authorizing any deviation(s) from the specifications unless they are specifically brought to notice of the Engineer.

3.6 Approval by the Engineer shall not relieve the Contractor from any of his contractual responsibility regarding satisfactory performance and other requirements of the works.

CHIEF ENGINEER
K.P.T

4.0 SPECIAL REQUIREMENTS

4.1 Pipes shall be suitable for the intended use.

4.2 Every pipe shall be tested at the manufacturer's works to specified hydraulic test pressure. The test pressure shall be maintained for sufficiently long time for proof and inspection.

4.3 Each pipe shall be permanently marked or engraved giving the following information:-

i Manufacturers Name or Trademark
ii Manufacturing date
iii Manufacturing number
iv Nominal diameter in mm
v Class or pressure rating
vi Manufacturers Inspection mark
vii Standards according to which the pipes and fittings have been manufactured.
viii Heat number should be embossed on all pipes, fittings and flanges

4.4 Unless otherwise specified, diameters of pipes and fittings shall be nominal. Actualinside and outside diameters and tolerances in diameters of pipes and fittings shall be according to the specified standards.

4.5 Unless otherwise specified, service ratings of pipes and fittings shall not be less than the maximum pressure to which they will be subjected to.

4.6 Unless otherwise specified, wall thicknesses of the pipes shall be according to the class, schedule or duty of the pipes. The wall thicknesses shall be measured at locations excluding the jointing ends. The tolerances in wall thicknesses shall be according to the specified standards.
Wall thicknesses of fittings shall not be less than those of corresponding pipes to which they are joined together.

4.7 Pipes and fittings ends shall be matching and compatible with each other and with the ends of valves and appurtenances to which they are joined.

4.8 Unless otherwise approved by the Engineer, pipes and fittings, jointing materials such asrubber rings, gaskets, nuts & bolts etc. shall be of the same manufacturers as those of the pipes and fittings.

5.0 MATERIALS

5.1 General

Materials shall conform to the latest referred standard specifications and other provisionsstipulated herein and shall be new and unused. Prior to procurement of the materials, theContractor shall be required to prepare and submit to the Engineer for his approval a complete schedule of materials to be used in the works together with a list of the names and addresses of the manufacturers and the trade names of the materials. The schedule shall include diagrams, drawings and such other technical data as may be required by the Engineer to satisfy himself as to the suitability, durability, quality and usefulness of the material intended to be purchased.

5.2 Pipes

UPVC Sewerage Pipes shall conform to specified or appropriate class of B.S. 3505.

5.3 Material

The material from which the pipe is produced shall consist substantially of polyvinyl chloride, to which may be added only those additives that are needed to facilitate the manufacture of the polymer, and production of sound, durable pipe of good surface

CHIEF ENGINEER
K.P.T

finish, mechanical strength and opacity. None of these additives shall be used separately or together in quantities sufficient to constitute a toxic hazard or to impair thefabrication of welding properties of the pipe or to impair its chemical and physical properties.

The pipe material shall not have any detrimental effect on composition of the water flowing through them. The quantities of lead, dialectal tin C4 and higher homologues andany other toxic substances extracted from the internal wall of the pipes shall not exceed the values specified in B.S 3505.

5.4 Joints

uPVC Sewerage pipes and fittings shall be joined with elastomeric rubber ring (gasket) or shall be solvent welded as specified herein, in bill of quantities, as shown on the drawings and/or as directed by the Engineer and shall conform to B.S. 4346. The elastomeric rubber rings shall conform to B.S. 2494.

6.0 PIPE TESTS

6.1 Factory Tests

The Contractor shall inform the Engineer the schedule of pipe manufacturing in thefactory for this particular project. The Engineer may visit pipe factory to inspect the pipe manufacturing process. The Engineer may assign his representative to supervise the manufacturing and testing of pipes.

The Contractor shall assign his representative at factory to supervise the pipe manufacturing and quality control.

The Contractor shall arrange the following tests at factory in the presence of Engineer or his representative on selected pipe samples.

i. Dimension measurements (Wall thickness, Diameter, Length)
ii. Visual Inspection

All the manufacturing pipes shall be individually checked for cracks and other defects before transportation to the site.

All pipes shall be properly marked at factory by embossing that number to identify the project consignment.

MTC – Mill Test Certificates for the above shall be submitted by the manufacturer.

6.2 Site Demonstration Test

6.2.1 The Contractor shall arrange the site visits of the pipe manufacturer or his representative to explain and demonstrate the pipe jointing, laying and hydraulic pressure testing procedure for all the pipe sizes, in the presence of Engineer before actual laying of uPVC pipes in the trenches.

Hydraulic pressure test shall be performed on at least pipe lengths jointed in a straight line with approved type rubber gaskets.

Separate demonstration test will be required for each uPVC pipe size to be installed. Requirements of standard hydraulic pressure test specified in the later part of this section shall be applicable to this demonstration test.

CHIEF ENGINEER
K.P.T

Pipe joints and pipe surfaces shall be inspected during this demonstration. If the pipe joint are found leaking and the leakage is more than the allowable limits, the demonstration will be rejected and the Contractor will be required to remove the defective material either pipes or rubber rings whichever is applicable.

The pipes and rubber rings shall be selected at random by the Engineer from the stock lot brought at site by the Contractor. The Contractor must ensure delivery of quality material at site. The whole stock/lot shall be rejected if the pipes do notpass the demonstration test.

7.0 HANDLING AND STORAGE

7.1 General

The Contractor shall be responsible for proper handling, as per manufacturer's recommendations, of pipes and pipe fittings etc. All the material shall be stacked in accordance with the manufacturer's recommendations at approved places as directed bythe Engineer.

7.2 Transportation

Transportation of pipes shall be done in such a way that they are secure and that no more than an absolute minimum of movement can take place on the vehicle during transit. The same care is needed if pipes are to be transferred from one vehicle to another, how short the final journey may be.

7.3 Off-loading

Cranes shall be used for off-loading. Whole sequence of operations shall be carried out smoothly and without snatch. Rope or nylon slings, lifting beams withflattened hooks or scissor-dog shall be used. Hooks and dogs shall be well padded to prevent the pipe being damaged and shall be fitted with locking device. Steadying ropesare essential.

7.4 Storage

Pipes should be carefully stored to prevent damage, pipes should not rest directly on ground. Solid timbers base should be set on ground for pipe stacking. Pipes should not be stacked so high as to over load the bottom. (The height of stack shall be furtherlimited by the head room available for any fitting gear used on site). Pipe sockets shouldnot normally rest on other pipes in the stack. The end pipes in the bottom row should be securely locked, wedges should be firmly anchored to prevent collapse of the stack. Pipes, and fittings damaged during handling, transporting or lowering shall be rejected and replaced at the contractor's expense. Storage shall be under shade so that all uPVCpipes & fittings are not exposed to sunlight and extreme heat.

8.0 LAYING AND INSTALLATION

8.1 Trenching

Pipe trenches shall be excavated upto required depth as indicated in the drawing. The excavated soil should be placed on one side of the trench leaving the other side clear for equipment and pipe handling. The bottom shall be carefully levelled. In-situ field density of trench bottom shall be determined. The bottom shall be compacted if insitu density is less than 60% of relative density as determined by ASTM D 2043. The test shall generally be carried out at spacing of 200 meters. If in some portion soft clayey

CHIEF ENGINEER
K.P.T

material or loose material is encountered 300 mm of this material shall be replaced by specified bedding material in that reach. If excavation is carried below required depth, the excessexcavated part shall be refilled with bedding material at no extra cost to the owner. (No bedding material shall be placed nor any permanent work commenced until the trench has been inspected by the Engineer and his permission to proceed to the work is given).

8.2 Stringing and Inspection

Stringing, consists of placing pipes on the ground in line ready for laying. Care is again needed to prevent damage during this operation.

The turned ends of all pipes shall be inspected to ensure that they are free from any local irregularities which could affect the water tightness of the joint. All pipe shall also be visually inspected for evidence of impact damage. When such damage is detected, a thorough examination of internal surface in region of the pipe ends shall be made for sign of hair cracks. Damaged pipes, joints, and fittings shall be rejected and replaced at the expense of the Contractor.

8.3 Bedding Material

Bedding material for pipe shall be of aggregate, free from boulders, clay, cinder, ashes and rubbish etc.

8.4 Laying

Laying shall start at the lowest point in the area in which work is being done, pipesections shall be laid with socket upstream.

Each length of uPVC Pipe between manholes shall be in a straight line and to the true alignment, position, gradient, and the inverts as shown on the Drawings, unless otherwise directed in writing and set out by the Engineer. The Contractor shall check andsatisfy himself as to the correctness of the final gradient, position, and slope of the complete sewer trenches before commencing the laying operation.

At all times when the work of laying the sewer is not in progress, all openings into the pipe and the ends of the pipe in trenches shall be kept tightly closed to prevent entrance of ground water, animals and foreign materials. The Contractor shall take all necessary precautions to prevent the pipe from floating due to water entering the trench from any source, and shall assume full responsibility for any damage due to this cause and shall, at his own expense, restore and replace the pipe to its specified position and grade if it isdisplaced due to floating.

The Contractor shall maintain the inside of the pipe free from foreign materials and in a clean condition until the work is completed and approved by the Engineer.

Pipe and accessories shall be carefully lowered into the trench by means of derricks, ropes, belt slings, or other suitable methods. Under no circumstances shall any of the pipe and other materials be dropped or dumped into the trench. Care shall be taken to avoid abrasion of the pipe.

The full length of each section of pipe shall rest solidly up on the prepared bed of trench. Pipes that have the alignment, grades or joints disturbed after laying, shall be removed and re-laid by the Contractor at his own cost. Pipe shall not be laid in water or when trench conditions are unsuitable for the work.

CHIEF ENGINEER
K.P.T

Jointin

Except where otherwise detailed on the drawings, all pipes and joints shall be of flexible type. Joints shall be of loose UPVC machine made coupling type having two rubber rings gaskets.

All joints shall be capable of withstanding the various tests specified for the appropriate class of pipe. Joints shall withstand while maintaining the specified test pressure at a deflection of not less than the values specified in the relevant specification No. BS 4346.

Rubber rings shall meet the requirements of the appropriate parts of BS 2494.

A lubricant shall be used for jointing the pipes as recommended by the rubber gasket manufacturer.

Whether the pipes are wet or dry the jointing faces and sealing rings need to be cleanand free from oil, grease, tar, mud or sand particles.

In placing the pipe and making the joints care shall be taken to avoid disturbance of bedding underneath the pipe barrel. If the joints cannot be made manually, mechanical pulling devices will be needed.

9.0 TESTING

9.1 General

After the joints are properly fixed and before backfilling the trenches, sewers shall be tested for infiltration or ex-filtration as specified. The Contractor shall test all sewers and their branches in such lengths and time selected at or approved by the Engineer. Sections of the completed sewer shall be isolated and measurement of the infiltration or ex-filtration shall be made by approved methods used for testing of sewer lines shall be absolutely free from insoluble impurities of any kind.

Water

No chemical or adhesive shall be used for water tighting and repairing of pipes.

Testreach in no case shall exceed 500 meter.

9.2 Infiltration

Sewer line shall be tested for infiltration test when the crown of the pipe is below the ground water table. The pipe length under test shall be completely emptied before starting infiltration test. The ends should be effectively closed.

One hour after completely emptying the pipes, depth of water shall be measured at both ends of the pipe. Estimated quantity of water infiltrated shall not exceed the specified allowable limits.

9.3 Ex-filtration

The sewers which are constructed with ground water level below the crown of the pipeshall be tested for ex-filtration.

A section of sewer shall be isolated between manholes by means of expanding stoppers or other approved methods. The length to be tested should be subjected to an internal pressure test of 1.20 meters head of water above the crown of pipe at the high end but not more than 6.0 meters at the low end.

Quantity of water required to achieve the starting level in the test reach after 1 hour shallbe measured which shall not exceed the specified allowable limits.

CHIEF ENGINEER
K.P.T

Allowable Infiltration or Ex-filtration

The calculated amount of infiltration or ex-filtration over a 24 hour period shall not exceed6 litres per millimeter dia. per kilometer of sewer which rate shall be applied to the actual sewer size and length tested to determine the allowable infiltration or ex-filtration over the 24 hour period.

If the measured infiltration or ex-filtration exceeds the specified allowable limit, then the Contractor shall locate the points of leakage and make necessary repairs so as to reduce the leakage to less than the permissible maximum stated above.

9.4 Commissioning

After successful infiltration/ex-filtration testing of selected isolated pipe lengths, the contractor shall clean all the sewer lines at no extra cost with the method approved bythe site Engineer prior to handing it over to the Owner.

10.0 MEASUREMENT AND PAYMENT

10.1 General

Except otherwise specified here in or elsewhere in the Contract document, no separate measurement and payment will be made for the under mentioned works related to the relevant items of the Bills of Quantities, but shall not be limited to the following. The cost thereof shall be deemed to have been included in the quoted unit rates of the respective items of the Bills of Quantities.

10.1.1 Submission of Samples.
10.1.2 Factory tests.
10.1.3 Site demonstration test
10.1.4 Cutting, jointing of sewer pipes.
10.1.5 Rubber rings.
10.1.6 Providing & Fixing of uPVC pipe.
10.1.7 Cleaning testing and commissioning of sewer lines.
10.1.8 Testing and compaction of trench bottoms.
10.1.9 Water used for testing of sewers.

10.2 Measurement

Measurement of acceptably completed works of providing, laying, cutting and jointing of uPVC pipes with rubber rings including cleaning and testing of sewer lines will be made on the basis of actual length in running meter of sewer pipes as per drawing or as directed by the Engineer.

10.3 Payment

Payment will be made for acceptable measured quantity of providing, jointing, laying, cutting and jointing of sewer pipes fittings with rubber rings including cleaning and testingof sewer lines on the basis of unit rate per running meter quoted in the bills of quantities and shall constitute full compensation for all the works related to the item.

CHIEF ENGINEER
K.P.T

MISCELLANEOUS ROAD WORKS

1. SCOPE

The work under this section of the specifications includes furnishing all plant, labour, equipment appliances and materials and performing of all operations of miscellaneous works i.e making of precast cement concrete fairface kerb stone, Gutter Block and Edge Block complete in accordance with this section of the specifications and applicable drawings and subject to the terms and conditions of the contract. The scope of work of this section of specifications is also covered by detailed specification as laid down herein.

2. PRE CAST CEMENT CONCRETE FAIR FACED KERB STONE/GUTTERBLOCK/EDGE BLOCK

2.1 Description

Under this item the contractor shall furnish and install in position the cement concrete fair faced finished kerb stones/gutter blocks/edge stone as shown on the drawings and in accordance with these specifications.

2.2 Materials

Cement concrete fair faced finished kerb stones/gutter block/edge block shall be fair face and precast using Class 'C' concrete

2.3 Construction

The form facing-material shall produce a smooth, hard, uniform texture on the concrete surface. It shall be smooth plane surface timber, steel or other approved material supported by strong studs or other backings capable of preventing deflection, deformations and to give straight edges and fair finish. Concrete shall be tipped from the trolley slightly in advance of the working place and then shoveled into position. The spreading shall be carried out very carefully. Compaction shall be done with vibrator compactor. It shall operate only in the mass of the concrete and should not be allowed to strike or displace the form. The spreading and compacting shall proceed without stoppage or interruptions and continue as quickly as possible so as to ensure that the curbs are monolithic and without plane of weaknesses and fully leveled throughout its length. When the initial set takes place, the surface shall be troweled smooth with a steel trowelto make dense, neat, clean and smooth top surface.

2.4 Protections and Curing

Concrete placed within the form shall be protected from harmful injuries by heatof the sun, rain, flowing water and all kinds of disturbance and mechanical injury and shall not be allowed to dry out from the time it is placed until the expiry of theminimum curing period of 14 days.

The Contractor shall exercise care in avoiding damage to kerbs while removing the forms. Forms may be removed when concrete has sufficiently hardened,

CHIEF ENGINEER
K.P.T

may be in 48 hours. Under no circumstances the use of pry bars between the forms and kerbs walls will be permitted.

All formed surface defects, visible vertical surface projections and irregularities shall be removed. The entire surface shall be rubbed, if required by the Engineer,with a carborandum brick No. 16 or other abrasive material until even, smooth and uniform surface appearance is made and washed and cleaned. Plastering of surface, application of cement or other coating will not be permitted.

3. MEASUREMENT AND PAYMENT

3.1 General

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

3.1.1 Earthworks, form work & concrete in foundations.

3.1.2 Preparation for application of paint and cleaning of pavement surfaces.

3.1.3 Cement sand mortar.

3.1.4 Fixing and installation of precast elements

3.2 Pre Cast Fairfaced Kerb Stone/ Mountable Kerb/ Edge Stone/ Gutter Block

3.2.1 Measurement

Measurement of acceptably completed works of pre cast fair faced kerb stone/ mountable kerb/ Edge stone/Gutter block will be made on the basis of actual length in running meter of kerb stone/edge stone/gutter block provided and placed in position as shown on the Drawing or as directed by the Engineer.

3.2.2 Payment

Payment will be made for acceptable measured quantity of pre cast cement concrete fair faced kerb stone/mountable kerb/ edge block/gutter block on the basis of unit rate per running meter quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the items.

CHIEF ENGINEER
K.P.T

TRAFFIC MARKING & PAVEMENT STUDS

1.0 SCOPE

The works under this section of specification consist of providing all materials, labour and equipment for furnishing of non reflective or reflective chlorinated rubber based or thermoplastic paint material or retro reflective performed pavement marking (tape) and reflectorized pavement studs complete in all respects in accordance with this section of specification and applicable drawings and/or as directed by the Engineer**.**

The paint shall be applied in conformance to the size, shape and location of the markings as shown in the Drawings.

02. APPLICABLE CODES AND STANDARDS

The codes and standards applicable to only a portion of the work specified in this section are referenced in the relevant parts and clauses. Standards and codes, which are generally applicable to the work of this section, are listed hereafter.

Sponsor	NumberSubject	
AASHTO	M 237	Epoxy Resin Adhesive for Bonding Traffic Markers to Hardened Concrete
AASHTO	M 247	Glass Beads Used in Traffic Paint
ASTM	D 1214	Sieve Analysis of Glass Spheres

Traffic signs, road markings and pavement studs shall also be in accordance with the requirements of international standards.

03. SUBMITTALS

The following submittals are required:

- Manufacturer's Data including application instructions.

04. STORAGE

Store materials on the project site in sealed and labeled containers as recommended By the manufacturer and as approved.

5.0 CHLORINATED RUBBER PAINT

5.1 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.

CHIEF ENGINEER
K.P.T

Composition

a) White Traffic Paint			
i)	Pigment	Titanium Dioxide Rutile and Extenders	100%
ii)	Vehicle	Modified Chlorinated Rubber	52 ± 4
		Solvents	45 ± 4
		Additives i.e. Flow levelling, adhesion improving agents, anti-oxidants, siccatives etc.	1 – 3%
iii)	Paint Composition	Pigments	55 ± 4% by Weight
		Vehicle, Solvent and Additives	
b) Yellow Traffic Paint			
i)	Pigment	Chrome Yellow and Extenders	100%
ii)	Vehicle	Same as for white traffic paint	55 ± 4 by Weight
iii)	Paint Composition	Pigments	45 ± 4% by Weight
		Vehicle, Solvent and Additives	
b) Black Traffic Paint			
i)	Pigment	Chrome Black and Extenders	100%
ii)	Vehicle	Same as for white traffic paint	55 ± 4 by Weight
iii)	Paint Composition	Pigments	45 ± 5% by Weight
		Vehicle	

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 beentirely 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.

5.1.1 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.

CHIEF ENGINEER
K.P.T

5.2 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:

		Colour			
		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

5.3 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 ofapplication 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, orupon 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.

CHIEF ENGINEER
K.P.T

6.0 HOT-APPLIED THERMOPLASTIC ROAD PAINTS

6.1 Material Requirements

6.1.1 Aggregate

The aggregate shall consist of light coloured silica sand, calcite,quartz, calcined flint, or other material approved by the Engineer.

6.1.2 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 EN 591-1.

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.

CHIEF ENGINEER
K.P.T

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 μm	75 – 95

6.2 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 specificationBS 3262 at following stages.

a) At the manufacturer's plant.
b) After it has been re-melted by the road application contractor.

6.2.1 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^{o}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

CHIEF ENGINEER
K.P.T

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 that 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.

6.3 Manufacturing Packing, and Storing of Paint

6.3.1 Manufact**uring**

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.

6.3.2 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.

6.3.3 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.

6.4 Certification

The Contractor shall furnish a certificate from manufacturer that the materialhe 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.

6.5 Application of Material to the Road

a) Preparation of Site

CHIEF ENGINEER
K.P.T

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 roadsurface is at a temperature of less than 5^0C.

b) Preparation of Material on Site

The material shall be melted in accordance with the manufacturer's instructions in heather 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 themanufacturer. 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 forlaying.
- 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 g/m^2 to 500 g/m^2 from the machine) shall be applied by pressure concurrently with the laying of the line with sufficient velocity to ensureretention 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 thefollowing 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

CHIEF ENGINEER
K.P.T

Not less than 90%, by mass of the ballotini, shall be of transparent glass, spherical in shape and not more then 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).

6.6 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.

7.0 RETOROREFLECTIVE PREFORMED PAVEMENT MARKINGS

7.1 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 cementconcrete (ACC) or Portland Cement Concrete (PCC) by a precoated pressuresensitive adhesive. A primer may be used to precondition the pavementsurface. The preformed marking film shall mold itself to pavement contours bythe action of traffic. The pavement marking film wearing courses during thepaving operation in accordance with the manufacturer's instructions, approvedby the Engineer. Following proper application and tamping, the markings shallbe immediately ready for traffic. The bidder, when bidding, shall identify propersolvents and / or primers (where necessary) for proper application, andrecommendation for application that will assure effective product performance.The preformed markings shall be suitable for use for one year after the date ofreceipt when stored in accordance with the manufacturer's recommendations. The marking film shall be durable retroreflective plisot polymer pavementmarking film for preformed longitudinal markings subject to low to mediumtraffic volumes and moderate wear conditions such as repeated shear actionfrom 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

CHIEF ENGINEER
K.P.T

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.

7.2 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 = 0.491, Y = 0.435; X = 0.512, Y=0.486; X = 0.526, Y

= 0.463.

Measurements shall be made in accordance with ASTM E 1349, using illuminant "C" and 0/45 (45/0) geometry. Calculations shall be in accordance with ASTM E 308 for the 2^0 standard observers.

7.3 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 (SL, 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

7.4 Skid Resistance

The surface of the retoreflective 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.

7.5 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.

7.6 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.

7.6.1 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% ofthe beads shall be lost due to popout and the predominant mode of failure shall be "wear down" on the beads.

7.7 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

CHIEF ENGINEER
K.P.T

bead adhesion shall be such that beads are not easily removed when the material surface is scratched.

7.8 Bead Retention

The film shall be ceramic and glass bead retention qualities such that when a2 in x 6 in. (5.08 cm x 15.24 cm) sample is bent over a 1/2 in. (1.27 cm)

diameter-mandrel, with the 2 inch dimension perpendicular to the mandrelaxis, 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%.

7.9 Thickness

The film without adhesive shall have a minimum thickness of 0.030 in (0.76mm).

7.10 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 orother signs of poor adhesion.

7.11 Installation

The markings shall be applied in accordance with the manufacturer's instructions.

8.0 CEMENTITIOUS 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.

9.0 REFLECTORIZED PAVEMENT STUDS

9.1 Material Requirements

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 on the Drawings.

The base shall be formed in cast iron with adequate webbing to ensure a firm key to the road when installed.

CHIEF ENGINEER
K.P.T

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 methacylate into the shape of a shallow frustum of a pyramid having base dimension of approximately 10cm x 10cm and thickness not more than two (2) cm or as shown on the drawings.

The shell shall contain one or two prismatic reflectors 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, shall comply with ASTM E809.

	COLOUR		
	Crystal	Yellow	Red
Divergence Angle	0.20	0.20	0.20
(in Degree)	S.I.	S.I.	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 form 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 form stray light. The distance from the centers of the light source and photocell shall be 0.53 cms.

CHIEF ENGINEER
K.P.T

Failure of more than four (4) % of the reflecting faces shall be cause for rejection of the lot.

ii) Strength Requirement

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 ofthe reflector through a six (6) mm diameter by six (6) mm highmetal 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.

c) 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	0.94
Titanium Dioxide	0.07
Colloidal Silica	0.05
Talc	0.345
Package B Modified Asphaltic Amine	Kg/Litre
Hardener (Reinchold 2611)	0.24
Modified Asphaltic Amine	
Hardener (Reinchold 2613)	0.472
Carbon Black	0.0022
Colloidal Silica	0.04
Talc	0.650

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.

d) Cement Mortar

Cement mortar shall consist of one (1) part Portland cement to three

(3) parts of fine aggregates.

CHIEF ENGINEER
K.P.T

9.2 Construction Requirements

9.2.1 '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 6.1 (d) above when the studs are installed into a cement concrete pavement.

9.2.2 'Raised Profile' Type

The pavement studs shall be installed in accordance with the manufacturer's instructions or to the requirements of the Engineer.

10.0 MEASUREMENT AND PAYMENT

10.1 General

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

10.1.1 All sampling and testing of road paint, studs.

10.1.2 Mockup specimen strip of pavement paint/ marking, and studs.

10.1.3 Surface preparation for application of road marking strips & studs.

10.1.4 Any loses of material wastage, over flow, erosion or any other causes.

10.1.5 Excavating cavities, applying adhesive and mortar for studs.

CHIEF ENGINEER
K.P.T

10.2 Pavement Marking

10.2.1 Measurement

Measurement of acceptably completed works of pavement marking will be made on the basis of net actual area in square metre of paintedsurface in position as shown on the Drawing or as directed by the Engineer.

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.

10.2.2 Payment

Payment will be made for acceptable measured quantity of pavement marking on the basis of unit rate per square metre quoted in the Bill of

Quantities & shall constitute full compensation for all the works relatedto the items.

10.3 Pavement Studs

10.3.1 Measurement

Measurement of acceptably completed works of pavement studs will be made on the basis of actual numbers of studs provided and installed in position as shown on the Drawing or as directed by the Engineer.

10.3.2 Payment

Payment will be made for acceptable measured quantity of studs on the basis of unit rate per number quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the items.

CHIEF ENGINEER
K.P.T

PRECAST CONCRETE PAVERS / TILES

1.0 **SCOPE**

The work shall consist of precast concrete paving blocks intended for the construction of low speed roads, parking areas, lay byes, industrial and other paved surfaces subjected to all categories of static and vehicular loading and pedestrian traffic. Paving blocks covered by these Specifications are designed to form a structural element and the surfacing of pavements, having the block to block joints filled, so as to develop frictional interlock and placed in conformity with the fines, grades, thicknesses and typical cross- section shown on the drawings or as directed by the Engineer.

2.0 MATERIAL REQUIRMENTS

For execution of this item provisions made in BS 6717 shall be applicable. Detailed requirement of materials and construction shall be as under:

2.1 Binders and Binder Constituents

Paving blocks shall be made using one or more of the following binders or binder constituents complying with the requirements of the relevant standards:

Ordinary Portland Cement	BS EN 19T-1
Portland Blastfurnace Cement	BS EN 19T-1
Portland Pulverized Fuel ash Cement	BS EN 19T-1
Pulverized fuel ash	BS EN 450-1
Ground granulated Blast furnace slag	BS 6699

2.2 Aggregates

Paving blocks shall be made using one or more of the following aggregates complying with the relevant standards:

Natural Aggregates (Crushed or Uncrushed)	BS EN 12620Air Cooled blast furnace slag BS EN 12620
Pulverized fuel ash	BS EN 450-1
Ground granulated blastfurnace slag	BS 6699

2.2.1 Acid Soluble Material (Fine Aggregate)

When tested as described in BS 812 : Part 119, the fine aggregate (material passing a 5mm sieve complying with BS ISO 3310-2) shall contain not more than 25% by mass of acid soluble material either in the fraction retained on, or in the fraction passing, a

600 μ m sieve.

2.3 Water

The water shall be. of drinking quality or in accordance with the recommendations ofappendix A of BS 3148: 2008.

CHIEF ENGINEER
K.P.T

2.4 Admixtures and Pigments

Proprietary accelerating, retarding and water reducing agents shall comply with BS EN480 Part 1.

Pigments shall comply with BS 1014.
Calcium chloride shall comply with BS 3587

2.5 Finishes

The finish should be agreed between the manufacturer and the Engineer.
Concrete described as "natural colour shall contain no pigment.

In composite paving blocks the surface layer shall be formed as an integral part of theblock and shall be not less than 5 mm thick.

2.6 Binder Content

The cement content of the compacted concrete shall be not less than 380 kg/m^3 for equivalent durability, paving blocks made with binder constituents other than ordinary Portland cement shall have higher binder content than paving blocks made in a similar way using only Portland Cement. The Engineer will decide the additional binder content. The compressive strength test will be the only guide to the amount of additional binder needed.

2.7 Sizes and Tolerances

2.7.1 Sizes

Paving blocks shall have a work size thickness of not less than 80 mm. Precast concrete tiles shall be used for walkways & footpaths and all pedestrians non vehicular areas. Type-R blocks shall be rectangular with a work size length of 200 mm and a work size width of 100 mm. Type-S blocks shall be of any shape fitting within a 295 mm square coordinating space and shall have a work size width not less than 80 mm.

The preferred work size thicknesses are 60 mm, 65 mm, 80 mm & 100 mm.

A chamfer around the wearing surface with a work size not exceeding 7 mm in width or depth shall be permitted.

All arises shall be of uniform shape.

2.7.2 Tolerances

The maximum dimensional deviations from the stated work sizes for paving blocks shall be as follows:

length	$\pm$	2mm
width	$\pm$	2mm
thickness	$\pm$	3mm

Where a paving block includes profiled sides, the profile shall not deviate from the manufacturer's specification by more than 2 mm.

2.8 Compressive Strength

The compressive strength of paving blocks shall be not less than 55 MPa (8000 psi) and the crushing strength of any individual block shall be not less

CHIEF ENGINEER
K.P.T

than 55 MPa (7200 psi) in conformance with ASTM C 936 for all vehicular areas appreciations.

2.9 **Sampling**

The following sampling procedure shall be used for the compressive strength test.

a) Before laying paving blocks, divide each designated section, comprising not more than 5000 blocks, in a consignment into eight approximately equal groups, Clearly mark all samples at the time of sampling in such a way that the designated section or part thereof and the consignment represented by thesample are clearly defined. Take two (2) blocks from each group.

b) Dispatch the sample to the test laboratory, taking precautions to avoid damage to the paving blocks in transit. Each sample shall be accompanied by a certificate from the person responsible for taking the sample, stating that sampling was carried out in accordance with this Part of BS 6717.

c) Protect the paving blocks from damage and contamination until they have been tested. Carry out any tests as soon as possible after the sample has been taken.

3.0 **CONSTRUCTION REQUIREMENTS**

3.1 **Laying the Concrete Blocks**

Before laying the concrete blocks sand cushion shall be placed on the prepared surface of aggregate base course or lean concrete base as per specification/drawings. Sand bedding layer shall be laid over such base for proper installation of paving blocks and tiles. A clean (i.e less than 1%) passing the 75μm sieve size hard, natural or manufactured sand shall be used for this purpose. Gradation analysis and soil degradation testing shall be conducted in conformance to ASTM C33.

The total area will thereby be divided with nylon strings into sectors of not more than

1.5 square meters. This shall be done to control the alignment of paving blocks and toavoid multiplication of deviation in sizes of paving blocks.

3.2 **Jointing Sand**

Finer graded (100% passing the 1.18mm sieve size) high guats by sand shall be used to fill joints (typically 5 to 6 mm i.e ¼ in) between the pavers. The jointing sand shall comply the gradation rrequirements of ASTM C144.

3.3 **Tolerance**

The surface will be tested with a four (4) meter straight edge by the Engineer at selected locations. The variation of the surface from the testing edge of the straight edge between any two (2) contacts with the surface shall at no point exceed four (4) millimeters when placed on or parallel to the centerline or three (3) millimeters when placed perpendicular to the centerline of the roadway. The top of the base shall not vary from the required elevation by more than five (5) millimeters. All humps and depressions exceeding the specified tolerance shall be corrected by removing the defective work and replacing itwith new material as directed by the Engineer.

CHIEF ENGINEER
K.P.T

4.0 MEASUREMENT AND PAYMENT

4.1 General

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

4.1.1 Providing, fixing, striking etc. of formwork.
4.1.2 Curing and testing of concrete.
4.1.3 Sand cushion in bed/joints for laying paving blocks/ tiles.
4.1.4 Edge precast blocks and cut units.
4.1.5 Cast insitu concrete to stablise edge precast blocks.

4.2 Pre-Cast Concrete Pavers

4.2.1 Measurement

Measurement of acceptably completed works of pre-cast concrete pavers will be madeon the basis of actual area in square metre of concrete paving blocks provided and laidin position to the line, level and grade as shown on drawing or as directed by the Engineer.

4.2.2 Payment

Payment will be made for acceptable measured quantity of pre-cast concrete pavers blocks on the basis of unit rate per square metre quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

4.3 Pre-Cast Concrete Tiles / Paving Tiles

4.3.1 Measurement

Measurement of acceptably completed works of pre-cast concrete tiles will be made on the basis of actual area in square metre of concrete tiles provided and laid in position to the line, level and grade as shown on drawing or as directed by the Engineer.

4.3.2 Payment

Payment will be made for acceptable measured quantity of pre-cast concrete Paving tiles on the basis of unit rate per square metre quoted in the Bill of Quantities and shall constitute full compensation for all the works related to the item.

4.4 Heavy Duty Pavers

4.4.1 Measurement

Measurement of acceptably completed works of heavy duty pavers will be made on the basis of actual area square meter of pavers provided and placed in position as shown on the Drawing or as directed by the Engineer.

4.4.2 Payment

Payment will be made for acceptable measured quantity of heavy duty pavers on the basis of unit rate per square meter quoted in the Bill of Quantities & shall constitute full compensation for all the works related to the items.

CHIEF ENGINEER
K.P.T

GRANULAR SUB-BASE COURSE AND CRUSH AGGREGATE BASE COURSE
And
BITUMINOUS SURFACE COURSE

CHIEF ENGINEER
K.P.T

KARACHI PORT TRUST
ENGINEERING DEPARTMENT

SPECIFICATION PART-III

SUB: CONSTRUCTION OF ROADS TO OIL INSTALLATION AREA, KEAMARI.

1 The Contractors must inspect the site & condition of the existing area, before tendering general conditions of contract, drawing & bill of quantity shall be read in conjunction with these specification.

2 Although the specification are sub divided under different headings, every part of it shall be deemed supplementary to and complementary to every other part and shall be read with it or into it so far as it may be practicable to do so.

3 The work has to be carried out at site in portions so as to cause the least dislocation to the flow of traffic on road it is proposed to deliver the site to the contractor in convenient portions so that the contractor completes the work in one portion and takes delivery of the next and hands over the completed portion to the Engineer for being put to use. However contractor suggest alternate facing for approval of engineer to suit the conditions at site during the execution of the work.

4 The material required for the work should be brought at site of works in convenient lots which will be determined by the Engineer on basis of programme to be furnished by the contractors.

5 All existing service s such as cables, mins pipes above or below the ground encountered during the course of work are to be maintained by the contractor in position and it working order, the cost of temporary supports and protection shall be borne by the contractor

6 The contractor will take all necessary precautions against fire hazard and arrange stand-by services of the fire staff at his own cost if necessary.

7 The contractors will include in their rate for providing barricading the job at site which will be needed at site for efficient and correct execution of work.

8 The contractor must inspect the site to assess regarding rates. The Contractor have to make proper provision in rates for filling all pot holes, signage, potion and damages slab to bring surface in one level.

9 The contractor has to provide job mix design formula of asphalt concrete from recognized soil and material testing laboratory as per approval for Engineer Incharge.

10 The contractor has to provide job mix design formula of asphalt concrete from recognized soil and material testing laboratory as per approval for Engineer Incharge.

11 The contractor has to make testing arrangements at site through recognized soil and material testing laboratory as per approval of the Engineer Incharge.

12 The work is to be carried out in working time in case of stoppage of work due to any incident or due to strike and other reason no clam of the contractor is to be entertained.

CHIEF ENGINEER
K.P.T

11. BITUMINOUS PAVEMENTS (CENTRAL PLANT HO MIX). DESCRIPTION

1.01 The pavement mix shall be composed of mineral aggregate and bituminous martial mixed in a central mixing plant meeting the requirement of these specifications until all aggregate particles are coated completely with bitumen. The pavement shall confirm in all respects in the line and grades, dimension and cross sections shown on the plans or as required by the Engineer

1.02 Job mix Formula: No work shall be started on the project nor any mixture accepted thereof until contractor has submitted samples materials intended for use and the engineer has approved the job mix formula based upon bests on the materials furnished. Percentage of bituminous material by why to be added shall be mixed by the Engineering within the range in table 1. The material furnish shall confirm to the job mix formula with in the tolerance specified here in.

JOB MIX TOLERANCES	PLUS OR MINUS
Aggregate passing sieve No. 4 and larger	5 Percent.
Aggregate passing sieves No.10 & 80	3 Percent.
Aggregate passing sieve No. 200	1 Percent.
Asphalt cement or Tar	0.3 Percent.
Temperature of mixing and placing	250 F.

When tolerances are used in conjunction with the job mix formula the resulting gradating shall not be outside of the specification limits.

2. MATERIALS.

2.01 AGGREGATE:

The aggregated shall consist of crushed stone, crushed gruel and screening and sand or any approved material having essentially the same qualities and meeting all the requirements when combined with in the limits for gradation.

The coarse aggregate (Plus No. 4 sieve) shall have 100% pass by. The aggregate shall be tough / durable / sound and shall consist angular fragments reasonable uniform in density and quality. The aggregate shall be free or dirt and other objectionable matter, and shall contain more than 8 percent of thin and elongated pieces, nor more then 5 percent of soft pieces.

The course aggregated when tested in accordance with the Los Angles rattler test. After 50 revolutions, shall have a percent of wear of not more the 45 According to there AASHO T96. The coarse aggregate shall not show evidence of disintegration nor show total loss greater than percent beyond the permissible when subjected to five cycles of the sodium sulphate accelerated soundness test using AASHO T104.

The portion of the material retained on a No. 4 mash sieve shall known as coarse aggregate: that portion passing a No. 4 mesh sieve shall be known as fine aggregate. And the material passing the No.200 mash sieve shall be known as filler. The composite material shall meet the requirements for one of the radiations given in table I using T27 or its equivalent.

The portion of the fine aggregate in, including binded filler passing No.40 mash sieve shall have plasticity index of not more then 6 determined by ASSHO T91 and Liquid limit of not more then 25 as determined by ASSHO T89 or its equivalent.

CHIEF ENGINEER
K.P.T

The composite aggregate shall be free from vegetable matter, lump or balls of clay, adherent films of clay, or other material will prevent through coating with bituminous to not that will per shall have a swell of not more than 1 ½ percent as determined ne ASSHO T101 or its equivalent.

2.02 BITUMINOUS MATERIALS:

The bituminous material to be mixed with mineral aggregate at the central plant & required for tack coat shall meet the requirements of ASSHO M20 or its equivalent. The penetration of the asphalt cement shall be between60 & 100as approved. A limited range or grade shall be selected for each project, such as 60/70, 80.
The bituminous materials for tack coat shall be asphalt cement of an approved quality and grade or as directed by the Engineer. Petroleum asphalt cement shall not be cracked.

3. COMPOSITION

3.01 COMPOSITION OF MIXTURE:

The material aggregate for the surface course shall be of such size that the percentage composition by weight as determined by laboratory sieves, will confirm to one of the following gradations:
The bituminous content of the mixture shall be calculated or it percentage on the basis by weight of the total mix.

Table 1 = Aggregate Bituminous Surface Coarse

Sieve Designation (Square opening)	Percentage by A 1st maximum	Weight passing B ¾" maximum	Sieve C ½" maximum.
1 inch	100	--	--
¾ Inch	82-100	-100	-100
1/2 inch	70-90	82-100	100
3/8 INCH	60-82	68-90	82-100
No. 4	42-70	50-70	56-88
No. 10	30-60	36-67	40-75
No. 40	15-40	17-44	19-48
No. 80	08-26	9-39	10-32
No. 200	03-08	3-8	04-09
Bituminous material present stone or gravel.	4.5-7.0	4.0-7.5	5.5-6

CHIEF ENGINEER
K.P.T

The gradations in the table represent the limits which shall determine suitability of aggregate for use from the sources of supply. The final gradations decided on within the limits designated in the table shall be uniformly graded from coarse to fine shall not very the low limit on one sieve to the high limit on the adjacent sieves, vice versa.

The selection of any of the gradations shown in the table shall such that the maximum size aggregate used shall not be more then ½ thickness of the layer of the surface course being constructed.

A sample of the coarse and in aggregate shall be washed to determine too percentage of the total material passing the No. 200 mess sieve of the amount of the material passing the No.200 mesh sieve at least ½ shall pass the No/200 mesh sieve by dry sieving.

The weights for the measurement of the bituminous mixture should be based on the bulk specific gravity of aggregate of 2-65.

Proportionate corrections shall be made when the aggregates furnished on the job (Job aggregate) have bulk specific gravities above 2.75 or below 2.55.

4. CONSTRUCTION METHODS

4.01 WEATHER AND SEASONAL LIMITATIONS:

The pavement course shall be constructed only when the surface upon which it is to be placed is dry, when the atmospheric temperature is above 40 F, and when the weather is not foggy of rainy, the temperature requirement may be waived, but only who so directed by the Engineer.

4.02 PREPARATION OF AREA TO BE PAVED:

The area to be paved shall be true to line and grade and have a dry and properly prepared surface prior to the start of paving operations. It shall be free from all loose screening and other loose foreign materials.

Where a base is rough or uneven, a leveling course shall be place use of a paver or motor grader and shall be properly competed before the placing of subsequent course.

When leveling course is not required, all depressions and other irregularities shall be patched or corrected and the work approved by the engineer before paving operation begins. All fatty and unsuitable patched be removed from the area to be paver. blotting of excusive deposit of asphalt with sand or stone shall not be permitted.

When tack coat shall be applied when the surface to be paved is an existing or newly laid. Portland comment concrete, brick or asphalt pavement surface. When a tack coat is required, it shall consist of an application of the asphalt material of the grade 80/100 or any other approved grade at the maximum rate of 5 pound per hundred square fit at a temperature between 285 F to 350 F.

The surfaces of cubes, gutters, vertical faces of existing pavement and all structures in actual contract, which asphalt mixes shall be painted with a this, complete coating of asphaltic material to provide a closely bonded watertight joint.

4.03 EQUIPMENT:

General all methods employed in performing the work an 11 equipment tools, and other plant and machinery used for fending materials and executing any part of the work shall be subject to the approval of the engineer before the work is started and whenever found unsatisfactory shall and improved as required. All equipment tools, machinery, and plant used must be maintained in a

CHIEF ENGINEER
K.P.T

satisfactory working condition.

A) **MIXING PLANT:**

The mixing plant used by the contractor n the preparation of the bituminous mixture shall be either a weigh batch or continues mix type.

When the mix is produced in batch type plant the aggregate shall weighted accurately in the designated preparation to provide the specification batch weight. Continuous mix plant shall in general be controlled in the same manner as batch type plants. Details of control differing because of the continuous mixing principle shall be governed by the instructions issued by the plant manufacturer whenever these instructions are not contrary to these specifications.

B) **BITUMINOUS DISTRIBUTORS:**

The distributor used for laying that bituminous tack coat shall have pneumatic tires of such width and number the load produced on the runway surface shall not exceed 650 pounds per inch of tire width and shall be so design equipped maintained and cooperated that bituminous material should not wear off. Distributer equipment shall include tachometer pressure gauges volume measuring devices devious and a thermometer for reading temperature of tank of and asphalt attachment suitable for applying bituminous material spots missed by the distributor the distributor shall be equipped for process. Other approved methods for spraying bituminous material on the surface may also be used.

C) **HEATING EQUIPMENT**:

The equipment for heating bituminous material shall consists of steam coils and equipment for producing stein so designed steam will not be introduction into the material. In the event storage tanks are used an armored thermometer with a range from 40 degrees to 400 F shall be fixed to the tank so that the temperature of the bituminous material may b determine at all times. Other approved heating facilities may be used.

D) **POWER SOONS AND POWER GLOWERS:**

Blowers and brooms shall be of the power type and shall be suitable for cleaning the surfaces. Other approved methods for cleanings the surface may be used.

E) **PLACING EQUIPMENTS:**

Equipment for spreading shaping and finishing shall consist of an approved self-contained power machine operating in such a manner that no supplemental spreading shaping or finishing will be required to provide a surface when will complaints the requirements for thickness and smoothness contained hearing.

F) **ROLLING EQUIPMENT:**

Rollers shall be suitably designed for the of bituminous surfaces the rolling shell be done with self propelled tender and three wheel type rollers weighing not less then 10 tons. the wheels on the rollers shall be equipment with adjustable scrapers which shall be used when necessary to clean the wheel surface. Rollers shall also be occupied with tanks and sprinkling apparatus which shall be used to keep the wheel wet and prevent the surfacing material free sticking.

Rubbers-tired rollers shall consists of two axis on which are mounted not less than nine pneumatic tires prevented-tire wheels in such manners that the rear group of tires. will not follow in the tracks of the forward group and will be centered between the forward wheel. The axis shall be mounted in rigid frame provided with a loading platform or body suitable for ballast loading. The tires shall be uniformly

CHIEF ENGINEER
K.P.T

inflated. The rollers shall be twins, equipments shall also be pneumatic-tired. the tires on both rolls and towing equipment shall be smooth one of a type that will not mark a warm asphalt pavement during rolling operation.

G) **SCALES:**

Scales shall be standard trade scales of the beam type and sufficient size and capacity to accommodate all trucks to be used by the contractor in handling bituminous in mixtures. The scales shall be tested and approved by an inspector of the "Weight and measures Department", Government of Pakistan or the scale will be tested by the employer the necessary numbers of standard weights for testing the scales shall be on hands at all times.

H) **WEIGHT HOUSES:**

Whenever bituminous is to be laid in tons/lb. weight house shall be weather proof and shall be constructed in a manner that will afford adequate protection for the rerecording device of the scale. the house shall be of a suitable size and shall be have one sliding windows facing the scale platform, one end window & a shelf desk at least 2 feet wide by 6 feet long.

4.04 **PREPARATION OF THE HIGHEST AGGREGATE:**

The aggregate and the mixture shall be dried and heated at the plant before entering the mixture. When introduced into the mixer the combined aggregate shall not contain more than percent moisture, if asphalt is used or more than 1 percent for tar mixture water in the aggregate shall be removed by heating to the extent that no subsequent fomowing shall occurs in the mixture prior to the placing of the material. The aggregate shall be heated to temperature to designate by job formula within the job tolerance specified. The maximum temperature of the rate of heating shall be such that no permanent damaged occurs to the aggregate. Particular care shall be taken that aggregates high in calcium magnesium content not damaged by heating. The aggregate shall be screened to specified size and conveyed and separate bins ready for mixing with bituminous material

The plant shall be provided with an accurate mechanical means of uniformly feeding the aggregate in to the dryer so that uniform production that uniform temperature may be obtained. When necessary to blend material compartment and feeders shall be supplied.

4.05 **PREPARATION OF BITUMINOUS MIXTURE:**

Before being delivered to the sit of the work aggregate shall be mixed with the bituminous material at a central mixing plant. the mixture shall be prepared at a temperature as directed by a engineer between 275f to 325F for asphaltic mixture.

The dry aggregate, prepared as prescribed above, shall be combined at the plant in the proportionate amounts of each fraction of aggregate redefine to meet the specified gradation. The quantity for aggregate for each batch shall be determined measure and conveyed in to the mixture. in case of volumetric proportioning the size of the gate opening shall be determined and gates locked in position.

Kettles for storage of bituminous material shall have total capacity sufficient for 1 day and shall be capable of heating the bituminous material with an effective and positive control of the heat and all time to a temperature of between 250F to325F. The temperature of the bituminous material at the time o0f mixing shall not exceed 325F (162.75). The temperature of mineral aggregate in the mixer shall not exceed 350F(176.67) when the asphalt is added.

CHIEF ENGINEER
K.P.T

The quantity bituminous material for each batch or calibrated amount of continuous mixture shall be determined by the engineer, and shall be measured by weight and introduced in to the mixture and the specified the mixture holding to the lowest range possible.

The exact temperature to be used on the work within the specified range shall be fixed by the engineer. In no case shall aggregate be introduced in to the mixture at a temperature more than 25F above the temperature of the bituminous material.

The mixing shall continue for a time determined necessary by the engineer to coat all particular uniformly. This time is dependent upon design and type of mixing equipment used. The compute the mixing time in the continuous mixer the weights of its contents at operating levels is divided by the weight if the mixture delivered per second by the mixer.

$$\text{Mixing time in second} = \frac{\text{Pug mill dead capacity in pounds}}{\text{Outputs in pounds per seconds}}$$

4.06 **TRANSPORTATION AND DELIVERY OF THE MIXTURE:**

The mixture shall be transporting for the mixing plant to the point of use in pneumatic tired vehicles heaving tight bodies previously cleaned of all foreign materialo0ther suitable material of sufficient size and thickness to protect it from the weather or dust condition. The range of temperature of the mixtures, when dumped in to the mechanical spreader specified herein before shall be determined by the engineer. Asphalt mixtures that have temperature of the less than 225F when dumped in to the mechanical spreaders will be rejected. When the mixture is being placed during warm weather and the engineer has determined that satisfactory result can be obtained at lower temperature.

No loads shall be sent out so late in the day as to interfere with sprucing and compacting the mixture during day light unless artificial light, satisfactory to the engineer , is provided. The mixture shall be delivered at a temperature within the tolerance allowed in the approved job formula.

No loads shall be sent out so late in the day as to interfere with sprucing and compacting the mixture during day light unless artificial light, satisfactory to the engineer , is provided. The mixture shall be delivered at a temperature within the tolerance allowed in the approved job formula.

4.07 **SPREADING AND LAYING:**

Preparation for placing Immediately before placing the bituminous mixture , the existing under lying course shall be cleaned of loosed or deleterious material by sweeping with a power sweeper equipped with blower, supplemented by hand brooms if necessary or as directed by the engineer.

The mixture shall be laid only upon an approved underlying course which is dry, which is in a suitable condition and only when weather conditions are suitable.

No mixture shall be placed when the air temperature in the sheds and a from artificial heat is 40'D (4.44) under, unless so directed by the Engineer. The Engineer may, however, permit work of tails character to continue when overtaken by sudden rains, upto the amount which may be transit from the plant at the time, provided the mixture is within the temperature limits specified.

Grade Control between the edges of the road shall be by means of grade stakes or steel pins placed in lanes parallel to the centerline the Road or plinth or other area and at intervals sufficiently close that string lines may be stretched between stakes or pins.

When hand spreading is permitted, the mixture shall be dumped upon arrival on approved dump sheets outside of the area on which it is to be spread and be distributed into placed immediately by means of hot shoves. It shall be spread with hot rakes in a uniformly loose layer to the full width

CHIEF ENGINEER
K.P.T

required and of such depth that, where the work is completed, it will have the required thickness and will confirm to the grade and surface contour shown

When hand spreading is permitted, the mixture shall be dumped upon arrival on approved dump sheets outside of the area on which it is to be spread and be distributed into placed immediately by means of hot shoves. It shall be spread with hot rakes in a uniformly loose layer to the full width required and of such depth that, where the work is completed, it will have the required thickness and will confirm to the grade and surface contour shown

When hand spreading is permitted, the mixture shall be dumped upon arrival on approved dump sheets outside of the area on which it is to be spread and be distributed into placed immediately by means of hot shoves. It shall be spread with hot rakes in a uniformly loose layer to the full width required and of such depth that, where the work is completed, it will have the required thickness and will confirm to the grade and surface contour shown

When hand spreading is permitted, the mixture shall be dumped upon arrival on approved dump sheets outside of the area on which it is to be spread and be distributed into placed immediately by means of hot shoves. It shall be spread with hot rakes in a uniformly loose layer to the full width required and of such depth that, where the work is completed, it will have the required thickness and will confirm to the grade and surface contour shown

When hand spreading is permitted, the mixture shall be dumped upon arrival on approved dump sheets outside of the area on which it is to be spread and be distributed into placed immediately by means of hot shoves. It shall be spread with hot rakes in a uniformly loose layer to the full width required and of such depth that, where the work is completed, it will have the required thickness and will confirm to the grade and surface contour shown

When hand spreading is permitted, the mixture shall be dumped upon arrival on approved dump sheets outside of the area on which it is to be spread and be distributed into placed immediately by means of hot shoves. It shall be spread with hot rakes in a uniformly loose layer to the full width required and of such depth that, where the work is completed, it will have the required thickness and will confirm to the grade and surface contour shown

When hand spreading is permitted, the mixture shall be dumped upon arrival on approved dump sheets outside of the area on which it is to be spread and be distributed into placed immediately by means of hot shoves. It shall be spread with hot rakes in a uniformly loose layer to the full width required and of such depth that, where the work is completed, it will have the required thickness and will confirm to the grade and surface contour shown on the plans.

Contract surface shall be pointed with a thin uniform coat of hot asphalted material just before the mixture is placed.

4.08 **COMPACTION OF MIXTURE:**

After spreading, and as directed by the Engineer, the mixture shall be thoroughly and uniformly compacted by a power deriver three wheel roller and tandem roller or rollers, weighting 10 tons or more. Rolling of the mixture shall begin as soon after spreading as it will bare the roller without under displacement or hair checking. When the first strip spread, rolling shall start in the centre and continue towards either edge. On subsequent strips laid, rolling shall start on the edge adjacent to previously laid material and continue towards the other edge.

Initial rolling shall be done longitudinally with tandem rollers / or three wheel rollers. The rollers shall overlap on successive strips .Alternate trips of the roller shall of slightly different lengths. The mixture

CHIEF ENGINEER
K.P.T

shall be subject to diagonal rolling crossing and lines of the first after three or more lanes are constructed, but cross rolling shall not exceed more than ½ with of the runway.

The speed of the roller small at all times be slow enough to avoid displacement of the hot mixture, any displacement occurring as a result reversing the direction of the roller, or from any other cause, shall be corrected at once by the use of rakes, and of fresh mixture where required.

Sufficient rollers of the designated type shall be furnished to adequately handle the output of the plant. Rolling shall continue until roller marks are eliminated, until the surface is of uniform texture and true to grade and cross section, and until the density of at least 92 percent of the theoretical density is obtained. Field density tests shall be make at least twice daily.

The theoretical density shall be computed as follows:-

$$\frac{100}{\text{Density \% mineral aggregate by weight \# \% bitumen by weight}}$$

Sp. Gr. Mineral aggregate Sp. Gr. Of bitumen

To prevent adhesion of the mixture to the roller, the wheels shall kept properly moistened, but an excess of either water or oil will not be permitted. The rollers shall be kept in good condition and shall be operated by competent and experience roller men. The roller shall be operated continuously as far as practicable and in such a manner that all parts of the pavement shall receive substantially equal compression and be free from objectionable roller marks.

When the Engineer has determined that conditions are such that adequate compaction or surface texture is not being obtained with the tandem or three wheel rollers, the contractor shall supplement those rollers with pneumatic rollers conforming to the requirements include above. The pneumatic rollers shall follow the steel-wheel rollers while course is still warm. The surface course only shall be rolled with pneumatic rollers; and the rolling shall continue until all the surface course has been subjected to at least three coverage.

At all places not accessible to the roller the mixture shall be thoroughly compacted with hot hand tempers. Hand tempers still weight not less than 25 pounds and shall have a tamping face area of not more then 50 square inches. The surface of the mixture after compression shall be smooth and true to the established crown and grade

Any mixture which becomes loose and broken, mixed with dirt or in any way defective prior to the application of the finish coat shall be removed and replaced with fresh hot mixture which shall be immediately compacted to conform with the surrounding area, all to be done at the expense of the contractor. Skin patching on an area that has been rolled shall not be allowed.

4.09. **<u>JOINTS:</u>**

A) General. The mixture at the joints shall comply with the surface requirements and present the same uniformity of texture, dentil smoothness, etc. as other sections of the course. In the formation of all joints, provisions shall be made for proper hand with the adjacent course for the full specified depth of the course.

Joint shall be formed by cutting back on the previous day's run so as to expose the full dept of the course and the exposed edge shall be given a light paint court of as fault, or tar, if necessary. The fresh mixture shall be placed against the joint and will be compacted by rolling.

B) Transverse: The placing of the course shall be as nearly continues as possible. The roller shall

CHIEF ENGINEER
K.P.T

pass over the unprotected end of the freshly laid mixture only when the laying of the course is to be discontinued.

C) Longitudinal: The placing of the course shall be in the manner specified and so that the joint is exposed for the shortest period possible.

4.10. SHAPING EDGES:

While the surface is being compacted and finished contractor shall carefully true the outside edges of the pavement to the proper alignment. The edge so formed shall be beveled while still hot with the back of a rake or a smoothing iron and through compacted by tampers or by other satisfactory methods.

4.11. SURFACE TESTS:

Tests for conformity with the specified crown and grade shall be made by the contractor immediately after initial compression and any variation shall be corrected by removing or acting materials and continuing the rolling.

The finished surface shall be very more than ¼ inch for the wearing course when tested with a 16-foot straight edge applied parallel with or at right angles to the centerline.

After the completion of final rolling, the smoothness of the course shall again be tested: the humps or depressions exceeding the specified clearances of that retain water on the surface shall be immediately corrected by removing the defective work and replacing with new material, as directed by the engineer and at the expense of the contractor.

4.12 SAMPLING PAVEMENT:

For the determination by the Engineer of composition. Compaction and density of the pavement the Contractor shall remember be suitable size samples of the completed pavement. Samples for each day or fraction thereof shall be taken. The contractor shall replace the pavement samples are removed, and these replacements shall be installed by Contractor free of charge. If the deficiency in composition and compaction exceeds the limits of toleration from that specified satisfactory corrections shall be made.

4.13. BITUMINOUS AND AGGREGATE MATERIAL CONTRACTORS RESPONSIBILITY:

Samples of the bituminous and aggregate materials that the contractor propose to use together with a statement as to their source and character must be submitted and approval obtained before use of such material beg. The contractor shall require the manufacturer or producer of the bituminous and aggregate materials to furnish material subject to this all other pertinent requirements of the contract. Only those materials have been demonstrated by service tests as satisfactory for the intended use will be acceptable.

For checking the adequacy of the equipment in use inspecting the conditions and operation of the plant for the verification of weights proportions and character of materials and or the determination and checking of temperatures being maintained in the preparation of the mixtures the engineer or his authorized representative shall have access at any time to all parts of the paving plant.

METHOD OF MEASURMENT

5.01 The bituminous paving as designated by the Engineer to be paid for shall be the number of hundred square feet of bituminous paving actually completed and accepted in accordance with the plans & specifications.

BASIS OF PAYMENT

Payment for quantities provided shall be made at the contract unit price P.Sq.M. for the bituminous as paving mixture required for various thickness of pavement. These prices shall be full compensation for furnishing all materials for all preparations mixing manipulations hauling placing compacting these materials and for all labour equipment tools and incidentals necessary to complete the work in full compliance with plans and specifications.

CHIEF ENGINEER
K.P.T

05 September 2022

KARACHI PORT TRUST

ENGINEERING DEPARTMENT

DOCUMENTS TO BE RETURNED

NAME OF WORK: MAINTENANCE / REPAIRS AND ROAD PATCH WORK AT VARIOUS LOCATIONS & LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA.

S.No	Description of Work	Unit	Rate	Quantity	Amount(Rs.)

Notes:-

a) After the completion of the work the contractor is required to clear away and remove from the site all construction plants, surplus material, rubbish, debris and temporary works of every kind etc. to the entire satisfaction of the Engineer. It may be noted that Contractors' account will not be finalized till such time a certificate to this effect is obtained from Executive Engineer and submitted to the Chief Engineer for his information.

b) The Contractor must ensure that the dismantled materials should be disposed is accordance with safety standards fixed by the civic agencies and specified environmental protection rules.

c) Debris dismantled materials, rubbish etc. should be disposed in such a way that it should not cause any pollution and shall not be source of harm to public.

d) The tenderer must fill all the pages of Performa "A" & A-1" of tender documents, and ensure enclosing of the pay order for Bid Security amount Rs. 800,000.00 of the bid amount.

e) The tenderers are advised to avoid cutting / over writing in B.O.Q. In case any cutting / over writing it should be properly re-write, sign and stamp otherwise, the tenders may not be considered.

f) The (Contractor Tech Representative) is band to visit the plan monthly & give satisfactory report after checking the plan or he is bond to visit on the call of the Engineer Incharge as & under required.

g) ***"Only the FBR & SRB Registered Contractors are eligible for bidding, Contractor has to quote their rates inclusive of all Govt. Taxes"***.

h) ***Any of the False / Forged / Tempered information provided by the Bidder may eligible him for the disqualification and forfeited of the Bid Security, covering under rules.***

CHIEF ENGINEER
K.P.T

Case -Id

M / R AND ROAD PATCH WORK AT VARIOUS LOCATIONS & LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA

Plan #

Dated :

S.No.	Ref.	Item description	Unit	Rate	Rate in Words	Quantity	Amount
1		TUCKING / CHIPPING / CHISELING & SCRAPING WITH MILLER MACHINE UPTO 2" DEPTH OF EXISTING CARPETTING / PAVEMENT WITH PICK AXES OR ANY OTHER APPROVED MEANS UPTO REQUIRED DEPTH I/C. DISPOSAL OF RUBBISH / DEBRIS ETC. OUTSIDE KPT LIMITS AS PER DIRECTIONS OF ENGINEER INCHARGE.	*PER SQ/M*			7,500.00	
2		PROVIDING AND LAYING 2" THICK AFTER COMPACTION CONSOLIDATED AVARAGE ASPHELT MACADOM CENTRAL PLANT HOT MIX WITH LIQUID ASPHALT 60 / 70 GRADE MANUALY LAYING I/C THE COST OF TUCKING WIRE BRUSHING CLEANING THE SURFACE AND LAYING TACK COAT @ 10 LBS PER 100 SFT IN PATCH WORK AS PER SPECIFICATION AND DIRECTION OF THE ENGINEER INCHARGE.	*PER SQ/M*			7,500.00	
3		DISMANTLING AND CHISELING CEMENT CONCRETE WORK (C.C OR R.C.C) INCLUDING DISPOSAL OF MATERIAL AS DIRECTED OUT SIDE KPT LIMIT ALL AS DIRECTED	*PER CU/M*			30.00	
4		EXCAVATION IS ANY KIND OF FOUNDATIONS, DRAINS, TRENCHES, EMBANKMENTS AREA SHAFTS, WELLS, INDEPENDENT HOLES ETC UP TO REQUIRED DEPTH AND 6FT BY ANY MEANS (MANUALLY OR MECHANICALLY) AND BACK FILLING THE EXCAVATED SPOIL WITH SAME MATERIAL CONSOLIDATION, WATERING AND COMPACTION IN LAYERS COMPLETE INCLUDING COST OF TIMBERING AND DEWATERING (IF REQUIRED) AND DISPOSE OFF SURPLUS SPOIL OUTSIDE KPT LIMIT OR AS DIRECTED BY THE ENGINEER IN CHARGE.	*PER CU/M*			60.00	
5		PROVIDING AND FIXING OF 8" DIA UPVC PIPE AND SPECIALS INCLUDING EXCAVATION / CUTTING OF WALL, GROUND ETC AND FIX WITH ALL ACCESSORIES LIKE ¿T¿, BENDS, SOCKETS, ELBOWS, ¿Y¿, UNIONS ETC COMPLETE AND USE OF BOND ADHESIVE ALL OF BEST APPROVED QUALITY AND MAKE INCLUDING COST OF MAKING GOOD THE DISTURB SURFACES ON LIKE TO LIKE BASIS, FIXED AT ANY HEIGHT ANY SURFACE.	*PER R/M*			155.00	
6		PROVIDING AND LAYING 1:2:4 CEMENT CONCRETE USING SCREENED GRADED BAJRI 20 MM (3/4") AND DOWN GAUGE HAVING A MINIMUM WORKING CUBE CRUSHING STRENGTH OF 3000 LBS. PER SQ. INCH AFTER 28 DAYS WITH A MIX NOT LEANER THAN 1:2:4 IN COLUMN, BEAMS, LINTELS, ROOF SLAB, CHAJJA, WALLS STAIRCASE, ETC., OF REQUIRED SHAPE AND DESIGN INCLUDING FORM WORK AND ITS REMOVAL, COMPACTING AND CURING ETC. COMPLETE, BUT EXCLUDING THE COST OF REINFORCEMENT IN BASEMENT AND GROUND FLOOR.	*PER CU/M*			30.00	

CHIEF ENGINEER
K.P.T

M / R AND ROAD PATCH WORK AT VARIOUS LOCATIONS & LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA

Plan #

Dated :

S.No.	Ref.	Item description	Unit	Rate	Quantity	Amount
7		CONSTRUCTION OF MANHOLES SIZE 2'-0"X2'-0" (INSIDE DIMENSIONS) X2'-0" DEEP COMPLETE FOR 4" TO 12" DIA. PIPE UPTO 3' - 11" DEPTHS WITH RCC COVER WITH FRAMES FIXED IN 8" THICK R.C.C. 1:2:4 SLAB, 6" THICK C.C. 1:3:6 C.C. BLOCK MASONRY WALLS SET IN 1:3 C.M. 6" THICK 1:3:6 C.C. IN FOUNDATION, 1/2" THICK CEMENT PLASTER IN 1:3 C.M. TO ALL INSIDE WALL SURFACES WITH & INCLUDING THE COST REINFORCEMENT ETC. COMPLETE AS PER DIRECTIONS OF ENGINEER INCHARGE.	*EACH*		10.00	
8		PREPARE SURFACE AND APPLYING ½" THICK CEMENT SAND PLASTER AT ANY HEIGHT OF RATIO 1:4, FINISHED SMOOTH INCLUDING CURING, SCAFFOLDING, CORNICES, EDGES ALL AS SPECIFIED AND DIRECTED.	*PER SQ/M*		300.00	
9		PROVIDING AND FIXING PRECAST ROAD KERB, GREY OF BEST APPROVED QUALITY OF SIZE 6" X 12" X 12" HAVING MINIMUM CUBE CRUSHING STRENGTH OF 3000 PSI AT 28 DAYS, LAID IN APPROVED PATTERN AND AT ANY SURFACE INCLUDING LAYING OF MAXIMUM 3¿ THICK 1:4:8 LEAN BED AS UNDER LAYER WITH LEVELING TO REQUIRED PROFILE, COMPACTION, AND FILLING JOINTS WITH CM 1:4 FOR INTERLOCKING COMPLETE AS PER DIRECTION OF ENGINEER INCHARGE.	*PER R/M*		65.00	
10		FIXING OF C.C BOSTON TILES OF SIZE 12"X12" OR AS PROVIDED LAID IN APPROVED PATTERN WITH 3" SAND COUSHIONING AS UNDER LAYER WITH LEVELLING TO REQUIRED PROFILE, COMPACTION ETC COMPLETE AS PER DIRECTION OF THE ENGINEER INCHARGE.	*PER SQ/M*		100.00	
11		PROVIDING AND FIXING OF REFLECTOR CAT EYES 3MM ON THE ROAD MARKING LINES WITH EPOXY OR NAILS AND OTHER NECESSARY FITTINGS COMPLETE IN ALL RESPECTS AS DIRECTED BY ENGINEER INCHARGE.	*EACH*		1,100.00	
12		CLEANING THE SURFACE BY REMOVING DUST, DIRT ETC COMPLETELY BY APPROVED MEANS AND MAKING THE SAME DUST FREE AND THEN APPLYING THERMOPLASTIC 1.50MM OR AS APPROVED PAINT FOR DEMARCATION LINES IN LONGITUDNAL & TRANSVERSE DIRECTIONS BOTH WAYS PARALLEL TO THE ROAD IN SIX INCH WIDTH BY APPROVED MECHANICAL MACHINES UPTO REQUIRED STANDARD I/C TRANSPOTATION, ADOPTING SAFETY / EHS MEASURES COMPLETE AS PER DIRECTIONS OF THE ENGINEER INCHARGE.	*PER R/M*		1,220.00	

CHIEF ENGINEER
K.P.T

M / R AND ROAD PATCH WORK AT VARIOUS LOCATIONS & LAYING OF STORM WATER DRAIN LINE AT LALAZAR AREA

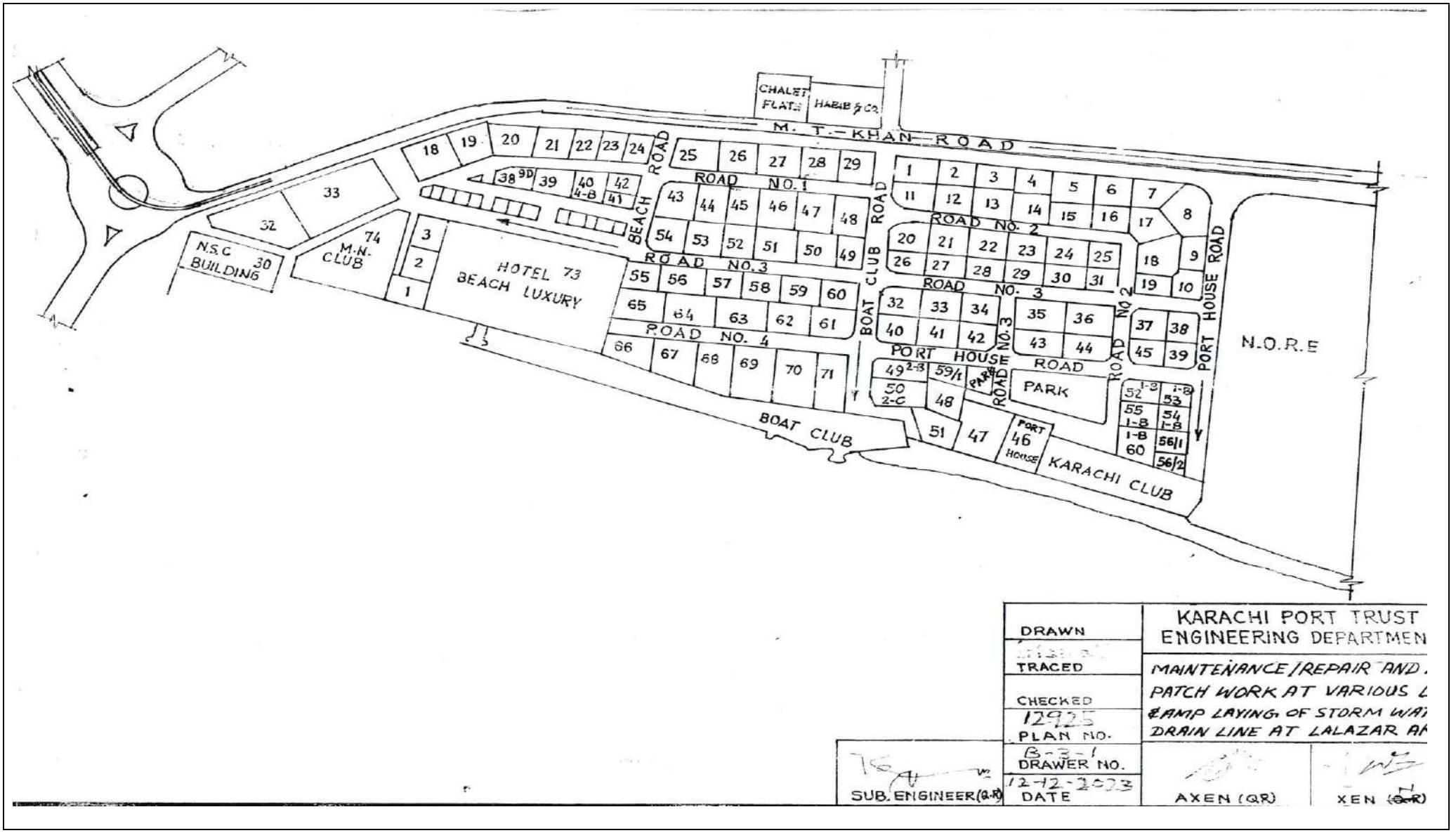
Plan #

Dated :

S.No.	Ref.	Item description	Unit	Rate	Quantity	Amount
13		REPAIRING OF EXISITING MS BARRIERS AND FIXING IT AGAIN AFTER COMPLETE WELDING, CUTTING, JOINTING AND OTHER NECESSARY REQUIREMENTS INCLUDING IF ANY PART REQUIRED AND ONE COAT RED OXIDE WITH 02 COATS ENAMEL PAINT ETC COMPLETE IN ALL RESPECTS AS DIRECTED BY ENGINEER INCHARGE.	*EACH*		4.00	
14		PROVIDING AND FIXING UP & DOWN MS BARRIER OF (2 NOS) HORIZONTAL & VERTICAL G.I PIPES 4" DIA 12 GAUGE & MS SHEET COVER IN CC 1:2:4 OR BLOCK MASONRY AT ONE END AND VERTICAL/ HORIZONTAL SUPPORTING PIPES, PULLEY, WHEELS ETC WHAT SO EVER RQUIRED I/C PAINTING, REQUIRED CUTTING AND CC WORK COMPLETE FIXED IN POSITION AS PER DIRECTIONS OF THE ENGINEER INCHARGE.	*EACH*		6.00	

TOTAL :	
ADD 5% CONTINGENCIES	**0**
NET TOTAL	
ADD 13% S.R.B	
GRAND TOTAL	**0**

CHIEF ENGINEER
K.P.T



CHIEF ENGINEER
K.P.T