TENDER DOCUMENT

NEW MANGALORE PORT AUTHORITY

CIVIL ENGINEERING DEPARTMENT

NIT No. CIVIL/CE(C)/EE(C)/66/2022-23

E-Tender Event No:-2023_NMPT_737593_1

Tender for

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

THROUGH E-TENDERING MODE

Tender Amount	:	Rs.29,74,220/-
E.M.D.	:	Rs.70,200/-
Tender Fee	:	Rs.560/-(Including GST @ 12%)

TENDER DOCUMENT

NEW MANGALORE PORT AUTHORITY

CIVIL ENGINEERING DEPARTMENT

Tender for

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

Volume - 1

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NEW MANGALORE PORT AUTHORITY

PANAMBUR, MANGALORE -575010

NIT No: CIVIL/CE(C)/EE(C)/66/2022-23 Date: 06-03-2023

CIVIL ENGINEERING DEPARTMENT

TENDER ID: 2023_NMPT_737593_1

i) NOTICE INVITING TENDER

(Through E-Procurement only)

E-Tenders are invited by New Mangalore Port Authority, Panambur, Mangalore-575010 through https://www.eprocure.gov.in/eprocure/app of CPP portal from the Contractor fulfilling the Minimum Eligibility Criteria stipulated in this notice in two cover bidding procedure for the work of "Providing Galvalume sheet roofing with G.I pipes over roof slab of Fire service building Near Mallya Gate and Traffic office building at Berth No.1"

a) The tenderers must have experience of having successfully completed *similar works during last 7 (seven) years ending last day of month previous to the one in which applications are invited shall be either of the following

At least Three similar completed works costing not less than the amount equal to Rs.11.90 lakhs each

or

At least Two similar completed works costing not less than the amount equal to Rs.14.90 lakhs each

or

At least One similar completed works costing not less than the amount equal to Rs.23.80lakhs

Note1:*Similar work(s) means Civil Construction Works or Renovation Works or Fabrication Works.

Note2: Documentary evidence for successful completion of the work shall be furnished along with work order and work completion certificate.

b) Average Financial turnover of the tenderer over the last three financial years 2019-20, 2020-21 and 2021-22 shall be at least Rs.8.95lakhs.

The financial capacity of bidders would be evaluated considering the works in hand at NMPA. The port would award the work not exceeding the remaining financial capacity of the bidder. The financial capacity to be 3.33times of the Average Financial Turnover of last three years of the bidder minus works in hand at NMPA. The bidder must fill the Annexure-6.

In case the average turnover is Rs.3.00crores, the financial capacity of the

contractor will considered as (3x3.333) Rs.10.00crores.

The turnover means sales/ contract receipts excluding taxes other income shall not be considered for calculation of turnover.

Pertinent information is given in the following table:

i)	Estimated Amount put to Tender	Rs.29,74,220/-
ii)	Earnest Money Deposit (EMD)	Rs.70,200/- (Rupees Seventy Thousand Two Hundred Only). The EMD shall be in the form of Insurance Surety Bonds, Account Payee Demand draft, Fixed Deposit Receipt, Bankers Cheque or shall be paid by RTGS in favour of F.A. & C.A.O., NMPA. Scanned copy should be uploaded along with bid. The benefit of Exemption of EMD to all Micro and small enterprises (MSE) will allowed. Shall upload with their offer, the proof of their being MSE registered with district industries center (DIC) or Khadhi and village industries commission or Khadhi and Industries board (KVIV) or Coir board or National Small Industries Corporation (NSIC) or Directorate of handicrafts and handlooms or Udyam Registration Certificate or any other body specified by Ministry of MSME.
iii)	Cost of Tender (Tender fee)	Rs.560/- (Rupees Five Hundred Sixty Only) Payment of Tender fee by NEFT in favour of F.A. & C.A.O., NMPA. Scanned copy should be uploaded along with bid. The benefit of Exemption of Tender fee to Micro and small enterprises (MSE) will allowed. Shall upload with their offer, the proof of their being MSE registered with district industries center (DIC) or Khadhi and village industries commission or Khadhi and Industries board (KVIV) or Coir board or National Small Industries Corporation (NSIC) or Directorate of handicrafts and handlooms or Udyam Registration Certificate or any other body specified by Ministry of MSME.
iv)	Document download start date and time	06-03-2023 at 15.00 HRS
v)	Seek clarification start date	NA

	and time	
vi)	Seek clarification end date and time	NA
vii)	Bid submission start date and time	20-03-2023 at 10.00 HRS
vii)	Bid submission closing date and time	27-03-2023 at 15.00 HRS
ix)	Date & time of opening of Cover -I : Technical Part - II : Financial	28-03-2023at 15.30 HRS Shall be communicated separately.
x)	Completion period	9 (Nine Months including monsoon)
xi)	Validity of Tender	120 days from the date of closing of online submission of e-tender.

Tenderer shall have to pay the prescribed cost of tender i.e., Rs.560/-(Rupees Five Hundred Sixty Only) by NEFT in favour of F.A. & C.A.O., NMPA.

NMPA Bank Details.

1. Name of the Bank: State Bank of India, Panambur, Mangalore - 575 010.
2. Bank A/C No. 10205649448
3. IFSC Code: SBIN0002249
4. MICR Code: 575002011

Contact Nos. 0824-2887307 and 0824-2407149

Email id: yogindra.s@nmpt.gov.in /chiefengineer@nmpt.gov.in

Amendments / further information etc. pertaining to the tender, if any shall be uploaded only on websites https://www.eprocure.gov.in/eprocure/app of CPP portal, may have to be referred by the prospective Tenderer from time to time.

-sd-

Executive Engineer (Civil)

NEW MANGALORE PORT AUTHORITY

PANAMBUR, MANGALORE -575010
NIT No: CIVIL/CE(C)/EE(C)/66/2022-23
E-Tender event No. 2023_NMPT_737593_1

ii) INSTRUCTIONS TO TENDERERS

A. Instructions for E-Tendering

INSTRUCTION TO E-TENDERING

1. SPECIAL INSTRUCTIONS TO THE BIDDERS FOR THE E-SUBMISSION OF THE BIDS ONLINE THROUGH THIS E-PROCUREMENT PORTAL

This is an e-procurement event of NMPA. The e-procurement service provider is https://www.eprocure.gov.in/eprocure/app of CPP portal. You are requested to read the terms & conditions of this tender before submitting your online tender. Tenderers who do not comply with the conditions with documentary proof (wherever required) will not qualify in the Tender.

1. Bidder should do Online Enrolment in the Portal using the option Click Here to Enroll available in the Home Page. Then the Digital Signature enrollment has to be done with the e-token, after logging into the portal.
2. Bidder then logs into the portal giving user id / password chosen during enrollment.
3. The e-token that is registered should be used by the bidder and should not be misused by others.
4. DSC once mapped to an account cannot be remapped to any other account. It can only be inactivated.
5. The Bidders can update well in advance, the documents such as certificates, purchase order details etc., under My Documents option and these can be selected as per tender requirements and then attached along with bid documents during bid submission. This will ensure lesser upload of bid documents.
6. After downloading /getting the tender schedules, the Bidder should go through them carefully and then submit the documents as per the tender document; otherwise, the bid will be rejected.
7. The BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for that tender. Bidders are allowed to enter the Bidder Name and Values only.
8. If there are any clarifications, this may be obtained online through the e-Procurement Portal, or through the contact details given in the tender document. Bidder should take into account of the corrigendum published before submitting the bids online on the portal or on www.newmangaloreport.gov.in Bidder, in advance, should prepare the bid

documents to be submitted as indicated in the tender schedule and they should be in PDF formats.

9. Bidder should arrange for the EMD and tender fee as specified in the tender. The benefit of Exemption of EMD to all Micro and small enterprises (MSE) will allowed. Bidder Shall upload with their offer, the proof of their being MSE registered with district industries center (DIC) or Khadhi and village industries commission or Khadhi and Industries board (KVIV) or Coir board or National Small Industries Corporation (NSIC) or Directorate of handicrafts and handlooms or Udyam Registration Certificate or any other body specified by Ministry of MSME will be considered. The bidder should read the terms and conditions and accepts the same to proceed further to submit the bids.
10. The bidder has to submit the tender document(s) online well in advance before the prescribed time to avoid any delay or problem during the bid submission process.
11. There is no limit on the size of the file uploaded at the server end. However, the upload is decided on the Memory available at the Client System as well as the Network bandwidth available at the client side at that point of time. In order to reduce the file size, bidders are suggested to scan the documents in 75-100 DPI so that the clarity is maintained and the size of file gets reduced. This will help in quick uploading even at very low bandwidth speeds.
12. It is important to note that, the bidder has to click on the Freeze Bid Button, to ensure that, he/she completes the Bid Submission Process. Bids, which are not frozen, are considered as Incomplete/Invalid bids and are not considered for evaluation purposes.
13. The Tender Inviting Authority (TIA) will not be held responsible for any sort of delay or the difficulties faced during the submission of bids online by the bidders due to local issues.
14. The bidder may submit the bid documents online mode only, through this portal. Offline documents will not be handled through this system.
15. At the time of freezing the bid, the e-Procurement system will give a successful bid updating message after uploading all the bid documents submitted and then a bid summary will be shown with the bid no., date & time of submission of the bid with all other relevant details. The documents submitted by the bidders will be digitally signed using the e-token of the bidder and then submitted.
16. After the bid submission, the bid summary has to be printed and kept as an acknowledgement as a token of the submission of the bid. The bid summary will act as a proof of bid submission for a tender floated and will also act as an entry point to participate in the bid opening event.

17. Successful bid submission from the system means, the bids as uploaded by the bidder is received and stored in the system. System does not certify for its correctness.
18. The bidder should see that the bid documents submitted should be free from virus and if the documents could not be opened, due to virus, during tender opening, the bid is liable to be rejected.
19. The time that is displayed from the server clock at the top of the tender Portal, will be valid for all actions of requesting bid submission, bid opening etc., in the e-Procurement portal. The Time followed in this portal is as per Indian Standard Time (IST) which is GMT+5:30. The bidders should adhere to this time during bid submission.
20. The bidders are requested to submit the bids through online e-Procurement system to the Tender Inviting Authority (TIA) well before the bid submission end date and time (as per Server System Clock).
21. Tender form Fee and EMD shall be submitted with the Part I- Technical BID. BID submitted without fees, as mentioned above will not be considered for evaluation and shall be rejected summarily. he benefit of Exemption of EMD and tender fee to all Micro and small enterprises (MSE) registered with district industries center (DIC) or Khadhi and village industries commission or Khadhi and Industries board (KVIV) or Coir board or National Small Industries Corporation (NSIC) or Directorate of handicrafts and handlooms or any other body specified by Ministry of MSME, will be considered. The bidder shall upload with their offer, the proof of their being MSE.
22. The bidder/tenderer/contractor shall file the applicable returns with Tax departments in time and submit the same as documentary proof. The GST applicable shall be shown as a separate line items in the Tax invoices to avail in put credit to Port.

2. Cover – I Details (Technical)

The following documents shall be uploaded online only.

1. Scanned copy of NEFT Payment details for cost of tender / documentary evidence for exemption of tender fee.
2. Scanned copy of RTGS/NEFT Payment details for EMD (bid security) / documentary evidence for exemption of EMD
3. Scanned copy of documents as per Annexure 1 to 13 of section I(iii) of volume-I (Original power of attorney i.e. Annexure 2 to be submitted by post or by hand immediately after the closing date for submission of online e-tender).
4. Scanned copy of valid PAN card, ESI, PF and GST Registration certificate.
5. List of Ongoing works in hand at NMPA should be indicated in the prescribed form.

6. Scanned copy of Form of Tender as per Section VI(iii) of volume -III
7. Technical bid document – Cover I (Volume I to Volume III) along with amendments and clarifications.

3. Cover – II Detail (Finance)

PRICE BID (Bill of Quantities)

Price should be quoted in the BOQ template available in the portal. The BOQ template must not be modified/replaced by the bidder and the same should be uploaded after filling the relevant columns, else the bidder is liable to be rejected for that tender. Bidders are allowed to enter the Bidder Name and Values only.

Any indication of 'Quoted price' in the online technical bid documents shall lead to rejection of the bid outright.

The price bid submitted through e-portal mode only will be taken up for the purpose for evaluation.

4. Opening of bids

A. Part I Techno-Commercial bid will be opened electronically on specified date and time as given in the NIT. Bidder(s) can witness electronic opening of bid.

B. Part II Price bid will be opened electronically of only those bidder(s) whose Part I Techno-Commercial Bid is found to be Techno-Commercially acceptable by NMPA. Such bidder(s) will be intimated, the date of opening of Part II Price bid, through valid email confirmed by them

Note: The tenderers are advised to offer their best possible rates. There would generally be no negotiations hence most competitive prices may be quoted while submitting the price bid. However in case the lowest rate appears to be reasonable taking into account the prevailing market conditions, the work may be awarded to the lowest bidder and if the rate is still considered high, action as per prevailing instructions / guidelines shall be taken. All entries in the tender should be entered in online Technical & Commercial Formats without any ambiguity.

5. Evaluation process:

A proposal shall be considered responsive if –

a. It is received by the proposed Due Date and Time.
b. It is Digitally Signed.
c. It contains the information and documents as required in the Tender Document.
d. It contains information in formats specified in the Tender Document.
e. It mentions the validity period as set out in the document.

f. It provides the information in reasonable detail. The Port Authority reserves the right to determine whether the information has been provided in reasonable detail.
g. There are no significant inconsistencies between the proposal and the supporting documents.
h. The Technical qualification conforms to as specified in the qualification criteria.
i. A Tender that is substantially responsive is one that conforms to the preceding requirements without material deviation or reservation. A material deviation or reservation is one (1) which affects in any substantial way, the scope, quality, or performance of the Tenderer or (2) which limits in any substantial way, inconsistent with the Tender document, or (3) whose rectification would affect unfairly the competitive position of other Qualified Applicant presenting substantially responsive bids.
j. The Port Authority reserves the right to reject any tender which in its opinion is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained by the Port Authority in respect of such Tenders.
k. The Port Authority would have the right to review the Technical Qualification and seek clarifications wherever necessary.
l. Since the tender involves selection based on pre-qualification criteria and technical specification, the Chief Engineer will examine and seek clarification if any and list out the firms, which are found technically suitable and Cover-II Price Bid of such tenderers only will be opened and EMD will be returned to the unsuccessful tenderers
m. The date and time will be intimated to tenderers whose offers are found suitable and Cover – II of such tenderers will be opened on the specified date and time
n. The cost of stamping Agreement must be borne by the successful Tenderer
o. The Fax/E-Mail offers will be treated as defective, invalid and rejected. Only detailed complete offers received through online prior to closing time and date of the tenders will be taken as valid.

B. Instructions To Tenderers (General)

1. Introduction:

This work essentially comprises of “Providing Galvalume sheet roofing with G.I pipes over roof slab of Fire service building Near Mallya Gate and Traffic office building at Berth No.1”

2. Applicants:

Contractors who wish to bid for the tender for the contract work should apply for the tender document. The successful bidder will be expected to complete the works by the intended completion date specified in the Contract document.

3. Invitation for Bids:

The online Invitation for Bids is open to all eligible bidders meeting the eligibility criteria. The bidders may submit bids for the works detailed in the NIT through e-tender mode only.

4. Purchase of Tender Documents:

Tender document can be downloaded from NMPA website www.newmangaloreport.gov.in, www.tender.gov.in & https://www.eprocure.gov.in/eprocure/app of CPP portal

5. One Bid per Bidder:

Each bidder shall submit only one bid for one package. Bidder who submits or participates in more than one Bid will cause all the proposals with the Bidder's participation to be disqualified.

6. Cost of Bidding:

The bidder shall bear all costs associated with the preparation and submission of his Bid, and the Employer will in no case be responsible and liable for those costs.

7. Site visit:

The Bidder, at the Bidder's own responsibility and risk is encouraged to visit and examine the work site and its surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract for construction of the Works. The costs of visiting the site shall be at the Bidders' own expense.

8. Content of Bidding Documents:

Tender Document will consist of:

Volume I	Section I	Notice Inviting Tenders Instructions to Tenderers Annexure (1 to 13)
	Section II	Form of Agreement
	Section III	Conditions of Contract: Part A - E: General Conditions

		Conditions of Contract : Part F: Special Conditions Contract Data Form of Securities (A & B) Appendix – I and Appendix - II
Volume II	Section IV	Technical Specifications
	Section V	Drawings
Volume III	Section VI	Preamble Bill of Quantities For of tender
	Section VII	Schedules (A & B)

Any indication of "Quoted price" in the technical bid, shall lead to rejection of the bid outright. For evaluation purpose the uploaded offer documents will be treated as authentic and final. No hard copy shall be submitted, upload the entire document on the CPP portal only.

9. Clarification of the Bidding Documents:

The Tenderers are advised to examine the Tender Document carefully and if there be or appear to be any ambiguity or discrepancy in the documents, or any clarifications needed on the Tender Documents; these shall be referred to the Chief Engineer (Civil) in writing, so as to reach at least three days before start date of submission of bid. It is to be noted that queries asked after closing date of pre bid meeting will not be answered. Employer's clarifications shall be furnished in the CPP e-portal or shall be issued a corrigendum in the web site after closing date of online pre-bid meeting without identifying the source.

A provision is made in the CPP e-portal for online pre-bid meeting during the date mentioned in the NIT. The bidders can ask queries if any during the period of pre-bid meeting through online. The queries of the bidders shall be answered online or a separate consolidated list of queries and clarifications shall be uploaded in web sites after closing date of online pre-bid meeting.

10. Amendment of Bidding Documents:

Any modification of the tender documents as a result of any ambiguity shall be shall be made exclusively through the issue of an Addendum. Any addendum thus issued shall be part of the tender documents and will be uploaded in CPP e-portal and Port website to all the bidders. Prospective bidders shall acknowledge receipt of each addendum to the Employer. Such addenda will be numbered and it shall be submitted by the Tenderers as part of Part I of their

bid. The Addendum can also be downloaded from NMPA official website from 'Ongoing Project link'. The responsibility of downloading such addendum / amendment from NMPA website and CPP e-portal fully lies with the bidder

11. Preparation of bids:

All documents relating to the bid shall be in the English language.

12. Minimum Eligibility Criteria:

a) The tenderers must have experience of having successfully completed *similar works during last 7 (seven) years ending last day of month previous to the one in which applications are invited shall be either of the following

At least Three similar completed works costing not less than the amount equal to Rs. 11.90 lakhs each

or

At least Two similar completed works costing not less than the amount equal to Rs. 14.9 lakhs each

or

At least One similar completed works costing not less than the amount equal to Rs. 23.80 lakhs

Note1:*Similar work(s) means Civil Construction Works or Renovation Works or Fabrication Works.

Note2: Documentary evidence for successful completion of the work shall be furnished along with work order and work completion certificate

b) Average Financial turnover of the tenderer over the last three financial years 2019-20, 2020-21 and 2021-22 shall be at least Rs.8.95lakhs.

The financial capacity of bidders would be evaluated considering the works in hand at NMPA. The port would award the work not exceeding the remaining financial capacity of the bidder. The financial capacity to be 3.33times of the average financial turnover of last three years of the bidder minus works in hand at NMPA. The bidder must fill the Annexure-6.

In case the average turnover is Rs.3.00crores, the financial capacity of the contractor will considered as (3x3.333) Rs.10.00crores.

The turnover means sales / contract receipts excluding taxes other income shall not be considered for calculation of turnover.

Copy of the work order, Client's satisfactory work completion Certificate, along with any other documentary proof certifying the year of completion, brief description of the project and project completion cost shall be submitted in

support of the assignments performed and claimed by the tenderer to fulfill the eligibility criteria for qualification. Experience of the tenderer / contractor for completed works, executed in private organization shall be considered only if the Tax Deducted at Source Certificate with respect to referred work, issued by Competent Authority is enclosed by the tenderer along with the tender

A statement duly certified by the Chartered accountant showing the average annual Financial Turnover over the last 3 financial years shall be submitted.

Even though the bidders meet the above qualifying criteria, they are subject to be disqualified if they have:

i) made misleading or false representations in the forms, statements and attachments submitted in proof of the qualification requirements; and/or
ii) record of poor performance such as abandoning the works, not properly completing the contract, inordinate delays in completion, litigation history, or financial failures etc.,

13. Bid Prices:

The contract shall be for the whole works as described in based on the priced Bill of Quantities submitted through CPP e-portal by the Bidder .The Bidder shall fill in the percentage of Excess or Less in the Bill of Quantities through CPP e-portal. Items for which no rate or price is entered will not be paid for by the Employer when executed and shall be deemed covered by the other rates and prices in the Bill of Quantities.

14. Currencies of Bid and Payment:

The Unit rates and the prices shall be quoted by the bidder entirely in Indian Rupees

15. Bid Validity:

Bids shall remain valid for a period not less than one hundred twenty days (120 days) after the last date for online bid submission. A bid valid for a shorter period shall be rejected by the Employer as non-responsive.

In exceptional circumstances, prior to expiry of the original bid validity period, the Employer may request that the bidders may extend the period of validity for a specified additional period. The request and the bidders' responses shall be made in writing or by cable. A bidder agreeing to the request will not be permitted to modify his bid and also shall submit an extension for EMD, if it is in the form of Bank Guarantee.

16. Bid Security / EMD:

i. The EMD shall be in the form of Insurance Surety Bonds, Account Payee Demand draft, Fixed Deposit Receipt, Bankers Cheque or shall be paid by RTGS/NEFT in favour of Financial Adviser & Chief Accounts Officer, New Mangalore Port Authority, Mangalore

   1. Name of the Bank: State Bank of India, Panambur, Mangalore - 10.
   2. Bank A/C No. 10205649448
   3. IFSC Code: SBIN0002249
   4. MICR Code: 575002011

ii. The Techno Commercial Bid shall be accompanied by the RTGS/NEFT deposit details towards Earnest Money Deposit of Rs.70200/- (Rupees Seventy Thousand Two Hundred Only) as stipulated in the tender. The tender without EMD shall be treated invalid. The benefit of Exemption of EMD and tender fee to all Micro and small enterprises (MSE) registered with district industries center (DIC) or Khadhi and village industries commission or Khadhi and Industries board (KVIV) or Coir board or National Small Industries Corporation (NSIC) or Directorate of handicrafts and handlooms or any other body specified by Ministry of MSME, will be considered. The bidder shall upload with their offer, the proof of their being MSE.

iii. In the event of Bidder withdrawing his Bid before the expiry of tender validity period of 120 days from the last date for online bid submission, the tender shall be cancelled and EMD shall be forfeited.

iv. The Earnest Money Deposit of unsuccessful bidder shall be returned without interest as early as possible by RTGS/NEFT on conclusion of contract. The Earnest Money Deposit of the successful bidder shall be refunded (without interest) after he has signed the agreement and furnished required performance security.

v. The Bid Security of a successful bidder will be forfeited in the following cases:

   a) If the bidder withdraws his Tender during the period of bid validity.
   b) In case of a successful tenderer fails

   i) to commence the work, apart forfeiture of other claims
   ii) within the specified time limit to sign the Agreement or furnish the required Performance Security. In the event of forfeiting the EMD / SD/LD and while imposing penalty GST as applicable will be collected.

17. No Alternative Proposals by Bidders:

Bidders shall submit offers that comply with the requirements of the bidding documents, including the basic technical design as indicated in the drawing and specifications. Alternatives will not be considered.

18. Format and Signing of Bid:

The Bid shall be in online mode. The Bid shall contain no alterations or additions, except those comply with instructions issued by the Employer.

19. Bid Submission:

Tender document including quoted bid price have to be submitted online only through CPP Portal before deadline for online submission of bid.

For evaluation purpose the uploaded offer documents will be treated as authentic and final. Any documents submitted in the form of hard copy except Power of attorney.

The Tender shall be submitted in Two Bids.

I. Technical Bid: Shall contain the following.
   i) Techno Commercial Bid: Shall contain all the documents. Techno Commercial Bid should not contain Price Bid. "Disclosure/indication of Price in the Techno Commercial Bid shall render the tender disqualified and rejected.
   ii) The details of payment of EARNEST MONEY DEPOSIT for Rs.70200/- (Rupees Seventy Thousand Two Hundred Only) by RTGS/NEFT to NMPA Bank Account, failing which the Techno commercial Bid shall not be considered).
   iii) Transaction details of payment towards the COST OF TENDER Fee is Rs. 560/-(Rupees Five Hundred Sixty Only) (To be paid by RTGS/NEFT to NMPA Bank Account).

II. FINANCIAL BID: shall contain only the Price.

III. LAST DATE FOR SUBMISSION OF ONLINE TENDER: is as per the date mentioned in the NIT

   NMPA may at its sole discretion reserves the right to extend the date for receipt of Bid. Bid after the aforesaid time and date or the extended time and date, if any, shall not be accepted by the portal.

   The following details pertaining to Techno Commercial Bid shall be uploaded online.

   a) Letter of Submission- Covering letter (vide Annexure – 1)

b) Power of Attorney in favour of signatory/s to the Tender, (vide Annexure-2) (Original power of attorney i.e. Annexure 2 to be submitted by post or by hand so as to reach the Executive Engineer (Civil) immediately after the closing date for submission of online e-tender).

c) Organization Details (vide Annexure-3)

d) Details of "Minimum eligibility criteria" as per Clause 12 of instruction to Tenderers and certificates (Client Certificates / work completion certificates or any other documentary evidences with respect to the eligibility work) (vide Annexure-4) of condition of contract. The following specific instruction may be noted ;

   i) Bidders are expected to provide information in respect of Eligible Assignments in this Section. The assignments cited must comply with the criteria specified in Clause No. 12 (a) for "Minimum eligibility".

   ii) A separate sheet should be filled for each of the eligible assignments the details are to be supplemented by documentary proof from the respective client for having carried out such assignment duly certified by client's completion certificates and work orders etc.

   iii) The works indicated in Annexure- 4 will only be considered for evaluation. Mere submission of work completion certificate will not be considered as Eligible Assignments.

e) A statement duly certified by Chartered Accountant showing Average Financial turnover of the tenderer over the last three financial years (vide Annexure-5) with balance sheet.

f) List of Ongoing works in hand at NMPA should be indicated in the prescribed form (Annexure 6)

g) A list of Plant and equipment proposed to be engaged for work. (vide Annexure-7) The equipment indicated in the Annexure -7 will form part of contract agreement and as such the bidders are requested to indicate the availability of the equipment at site at what stage of the construction period the equipment would made available.

h) Tenderer should submit copy of Permanent Account Number. (PAN), ESI, PF and GST Registration (GSTIN) Number along with certificates issued by the authority as applicable

i) A declaration to the effect that (vide Annexure -8):-

   a. All details regarding construction plant and machinery, temporary work and personnel for site organization considered necessary and sufficient for the work have been furnished in the Annexure to Conditions of Contract in Volume I and that such plant,

temporary works and personnel for site organization will be available at appropriate time of relevant works for which the equipment have been proposed at site till the completion of the respective work.

b. No conditions are incorporated in the financial bid. In case any conditions are specified in the financial bid, the tender will be rejected summarily without making any further reference to the bidder.

c. We have not made any payment or illegal gratification to any persons/ authority connected with the bid process so as to influence the bid process and have not committed any offence under PC Act in connection with the bid.

d. We disclose with that we have made / not made payments or propose to be made to any intermediaries (agents) etc., in connection with the bid.

j) NEFT Payment details towards cost of tender / documentary evidence for exemption of tender cost.

k) RTGS/NEFT Payment details towards EMD / documentary evidence for exemption of EMD

20. Deadline for Submission of the Bids:

i) The completed bid shall be submitted in the electronic form by the date and time mentioned in NIT only through CPP e-portal.

ii) The Employer may extend the deadline for submission of bids by issuing an amendment in accordance with Clause 10, 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.

iii) Price should be quoted in CPP e-portal. Any indication of 'Quoted price' in the online technical bid documents shall lead to rejection of the bid outright. For evaluation purpose the uploaded offer documents will be treated as authentic and final. No hard copy shall be submitted for reference purpose. The bid submitted through e-tendering mode only will be taken up for the purpose for evaluation.

iv) The uploaded Port Tender Document will be treated as authentic tender and if any discrepancy is noticed at any stage between the Port's tender document and the one submitted/uploaded by the tenderer, the conditions mentioned in the Port's uploaded document shall prevail. Besides, the tenderer shall be liable for legal action for the lapses.

21. Late Bids:

The time that is displayed from the server clock at the top of the CPP e-portal,

will be valid for all actions of requesting bid submission, bid opening etc., The bidders should adhere to this time during bid submission.

22. Modification and Withdrawal of Bids:

i) Bidders may modify the offers by deleting their already freeze bids in online only through CPP e-portal (after submission of bid) and resubmit/upload the revised offer before the deadline prescribed in Clause 20.

ii) No bid shall be withdrawn and resubmitted through CPP e-portal by the bidder after the deadline for submission of bids.

iii) Withdrawal of a Bid between the deadline for submission of bids and the expiration of the original period of bid validity specified in Clause 15 may result in the forfeiture of the Bid Security or the bidder shall be disqualified from bidding for any contract with New Mangalore Port Authority for a period of 2 (two) years in pursuant to Clause 16.

iv) Bidders may only modify the prices and other required details of their Bids by Resubmitting Bid only in accordance with this clause through CPP e-portal.

23. Bid Opening - Technical Bid:

a. On the due date and time as specified in Clause 20, the Employer will first open Techno Commercial bids of all bids received online in presence of the Bidders or their representatives who choose to attend. In the event of specified date for bid opening is declared as holiday by the Employer, the bid will be opened at the appointed time and location on the next working day.

b. In the first instance the Techno Commercial Bid containing the RTGS/NEFT payment details of EMD & Cost of tender document will be verified. If EMD and Tender Fee is in line with the Tender Condition there after the Techno Commercial Bid will be considered for evaluation.

c. If all Bidders have submitted unconditional Bids together with requisite Bid security, then all Bidders will be so informed then and there. If any Bid contains any deviation from the Bids documents and / or if the same does not contains Bid security in the manner prescribed in the Bid documents, then that Bid will be rejected and the Bidder informed accordingly.

24. Bid Opening – Financial Bid:

The date and time of opening of price bid (cover-II) shall be intimated to the qualified bidders based on the evaluation of the technical bid. The price bid (cover-II) of such eligible bidders shall be opened on the specified date and time.

If bidder withdraws his tender after opening of price bid the bidder will be

disqualified for participating in NMPA tender for a period of two years.

25. Clarification of Bids:

To assist in the examination and comparison of Bids, the Employer may, at his discretion, ask any Bidder for clarification of his Bid, including breakdown 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.

No Bidder shall contact the Employer on any matter relating to his bid from the time of the bid opening to the time the contract is awarded. If the Bidder wishes to bring additional information to the notice of the Employer, he should do so in writing.

Any effort by the Bidder to influence the Employer's bid evaluation, bid comparison or contract award decisions, may result in the rejection of his bid.

26. Examination of Bids and Determination of Responsiveness:

Prior to detailed evaluation of Bids, NMPA will determine whether each Bid

a) Meets the eligibility criteria as defined in Clause 12.
b) Has been properly signed by an authorised signatory (accredited representative) holding Power of Attorney in his favour. The Power of Attorney shall interalia include a provision to bind the Bidder to settlement of disputes clause;
c) Is accompanied by the requisite Bid security and;
d) Is responsive to the requirements of the Bidding documents.

A responsive Bid is one which conforms to all the terms, conditions and specification of the Bidding documents, without material deviation or reservation. A material deviation or reservation is one

a) Which affects in any substantial way the scope, quality or performance of the Works;
b) Which limits in any substantial way, the Employer's rights or the Bidder's obligations under the Contract; or
c) Whose rectification would affect unfairly the competitive position of other Bidders presenting responsive Bids.

The tenderer shall submit a certificate in the tender schedule in the Technical Bid that he has not incorporated any conditions in the Financial Bid and in case any conditions are specified in the financial bid his tender will be rejected without making any further reference to him.

If a Bid is not substantially responsive, it shall be rejected by the Employer, and may not subsequently be made responsive by correction or withdrawal of the non-conforming deviation or reservation.

27. Correction of Errors: (Not Applicable)

28. Evaluation and Comparison of Bids:

The Employer will evaluate and compare only the Bids determined to be responsive in accordance with Clause 26. In evaluating the Bids, the Employer will determine for each Bid the evaluated Bid Price by adjusting the Bid Price as follows:

a) Making appropriate adjustments to reflect discounts or other price modifications offered in accordance with Clause 22.

29. Alteration of tender documents:

No alteration shall be made in any of the tender documents or in the Bill of Quantities and the tender shall comply strictly with the terms and conditions of the tender document. The Employer may however ask any tenderer for clarifications of his tender if required. Nevertheless, no tenderer will be permitted to alter his tender price after opening of the tender.

30. Alternative conditions and Proposal:

The Tenderer shall note that alternative or qualifying tender conditions, or alternative design proposal for whole or part of the work will not be acceptable. Tenders containing any qualifying conditions or even Bidder's clarifications in any form will be treated as non-responsive and will run the risk of rejection. Part II: Price Bid of such Bidder's will not be opened.

31. Award of Contract:

The Employer will award the Contract to the bidder whose bid has been determined to be responsive to the bidding documents and who has offered the lowest evaluated bid price, provided that such bidder has been determined to be

a) Eligible in accordance with the provisions of Clause 12, and
b) Qualified in accordance with the provisions of Clause 12.

32. Notification of Award:

i) The Bidder whose Bid has been accepted will be notified about the award by the Employer prior to expiration of the Bid validity period by, fax or e-mail and confirmed by registered letter. This letter (hereinafter and in the Conditions of Contract called the "Letter of Acceptance") will state the sum that the Employer will pay the Contractor in consideration of the execution, completion and maintenance of the works by the Contractor as prescribed by the Contract (hereinafter and in the Contract called the "Contract Price").

ii) The notification of award will constitute the formation of the Contract

subject only to the furnishing of a performance security in accordance with the provisions of Clause 34.

iii) The Agreement will also incorporate all correspondence exchanged between the employer and the successful bidder. Within 21 days of receipt of Letter of Acceptance, the successful bidder shall furnish the performance security and sign the Agreement with the Employer. The contractor shall make 12 copies of the Agreement and submit to the employer within 7 days following the date of signing of Agreement.

33. Release of Bid Security / EMD:

The Earnest Money Deposit of unsuccessful bidder, shall be returned without interest by RTGS/NEFT on conclusion of Contract. The Earnest Money Deposit of the successful bidder if deposited in cash, shall be refunded (without interest) after he has signed the agreement and furnished required performance security.

34. Performance Security:

i) Within 21 days of receipt of the Letter of Acceptance, the successful Bidder shall deliver to the Employer a Performance Security in the form in the form of Insurance Surety Bonds, Account Payee Demand draft, Fixed Deposit Receipt from a commercial bank, remittance by RTGS for an amount equivalent to 3% of the Contract price including GST, as applicable rounded off to the nearest 1000.

ii) If the performance security is provided by the successful Bidder in the form of a Bank Guarantee, it shall be issued by a Nationalized /Scheduled Indian bank having its branch at Mangalore acceptable by NMPA. The BG shall be issued in favor of New Mangalore Port Authority in the Format enclosed in Volume I as Annexure-A.

35. Fraud and Corrupt Practices:

The bidder and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Selection Process. Notwithstanding anything to the contrary contained in this document, the Port shall reject the tender without being liable in any manner whatsoever to the bidder, if it determines that the bidder has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice (collectively the “Prohibited Practices”) in the Selection Process. In such an event, the Port shall, without prejudice to its any other rights or remedies, forfeit and appropriate the Bid Security or Performance Security, as the case may be, as mutually agreed

genuine pre-estimated compensation and damages payable to the Port for, inter alia, time, cost and effort of the Authority, in regard to the Tender, including consideration and evaluation of such Bidder's Proposal. Such Bidder shall not be eligible to participate in any tender or RFP issued by the Authority during a period of 2 (two) years from the date such Bidder is found by the Authority to have directly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as the case may be.

For the purposes of this Clause, the following terms shall have the meaning hereinafter respectively assigned to them:

(a) "corrupt practice" means

i) The offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the action of any person connected with the Selection Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the Authority who is or has been associated in any manner, directly or indirectly with the Selection Process or the LOA or has dealt with matters concerning the Agreement or arising there from, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the Authority, shall be deemed to constitute influencing the actions of a person connected with the Selection Process; or

ii) Engaging in any manner whatsoever, whether during the Selection Process or after the issue of the LOA or after the execution of the Agreement, as the case may be, any person in respect of any matter relating to the Project or the LOA or the Agreement, who at any time has been or is a legal, financial or technical consultant/ adviser of the Authority in relation to any matter concerning the Project;

(b) "fraudulent practice" means a misrepresentation or omission of facts or disclosure of incomplete facts, in order to influence the Selection Process;

(c) "coercive practice" means impairing or harming or threatening to impair or harm, directly or indirectly, any persons or property to influence any person's participation or action in the Selection Process;

(d) "undesirable practice" means

i) establishing contact with any person connected with or employed or

engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Selection Process; or

ii) having a Conflict of Interest; and

(e) "Restrictive practice" means forming a cartel or arriving at any understanding or arrangement among Applicants with the objective of restricting or manipulating a full and fair competition in the Selection Process.

36. Rejection of Tender:

Any Tender not conforming to the foregoing instructions will not be considered. The Employer does not bind himself to accept the lowest or any tender and has the right to reject any tender without assigning any reason thereof. No representation whatsoever will be entertained on this account.

37. Additional Information:

The "Instructions to Tenderers" shall not form part of the Contract. They are intended only to aid the Tenderers in the preparation of their tender.

38. Compliance of Local Content as per Make in India Policy:

Bidder shall comply with DPIIT Order No. P-45021/2/2017-PP(B-II) dtd. 16-09-2020 in respect of Local Content and furnish an undertaking in the prescribed format as per Annexure 13, to that effect, failing which, the bid may be liable for cancellation.

iii) Annexure

Annexure-I

LETTER OF SUBMISSION - COVERING LETTER

(ON THE LETTER HEAD OF THE BIDDER)

Date:

To,

The Executive Engineer (Civil),
New Mangalore Port Authority,
Administration Building,
Panambur, Mangalore – 575 010

Sir,

Sub: The work of "Providing Galvalume sheet roofing with G.I pipes over roof slab of Fire service building Near Mallya Gate and Traffic office building at Berth No.1"

Being duly authorized to represent and act on behalf of ..... (Hereinafter referred to as "the Bidder") and having reviewed and fully understood all of the requirements of the bid document and information provided, the undersigned hereby apply for the project referred above.

We are submitting our Bid enclosing the following, with the details as per the requirements of the Bid Document, for your evaluation.

i. Tender Document along with Addendum No ----
ii. Power of Attorney - (Annexure - 2)
iii. Organization Details - (Annexure - 3)
iv. Details to fulfill the "Minimum Eligibility Criteria" and certificates – (Annexure 4)
v. Average Financial turnover over the last three financial year - (Annexure 5)
vi. List of ongoing works at NMPA - (Annexure-6)

vii. List of plant and equipment – (Annexure - 7)

viii. Declaration – (Annexure – 8)

ix. Bid Security/EMD Paid by RTGS/NEFT vide UTR No.....dtd. ..... of (name and address of the branch).

x. Banker's Details – Annexure 10 & 11

xi. Tender fee paid by NEFT vide vide UTR No.....dtd. ..... of (name and address of the branch).

xii. Copy of valid PAN Card ESI, PF & GST Registration certificate.

Signature
(Authorised Signatory)

Annexure – 2

ON STAMP PAPER of Rs.100/-

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

--

FORMAT OF POWER OF ATTORNEY (in original)

In favour of signatory/s to the Tender, duly authenticated by Notary Public.

POWER OF ATTORNEY IN FAVOUR OF ---------- (Name, Designation, Company name)

TO ALL TO WHOM THESE PRESENTS shall come, I, (Name & address of the authorized person to sub-delegate/delegate powers, delegated on him by the Board of Directors) do hereby sub-delegate/delegate, in terms of the powers delegated to me by the Board of Directors, ---------- (name of the Co.) to Shri ---------- (name, designation & address of the Attorney) the following:

NOW KNOW YE AND THOSE PRESENTS that I, (Name & address of the authorized person to sub-delegate/delegate powers, delegated on him by the Board of Directors), do hereby authorize and empower Shri ---------- (name, designation & address of the Attorney) to do severally amongst others, for the purpose of carrying on our business, the following:

a) To represent lawfully the (name of the Co.) for obtaining bid/tender documents, prepare, sign, execute and submit tenders for execution of (Name of work)or any other works incidental to such construction works.
b) To discuss the technical and financial matters, negotiate and accept prices and take decisions regarding terms and conditions and sign agreements and contracts and also to bind the (name of the Co.) to the arbitration clause included in the contract.
c) For all or any of the purposes here of to sign and deliver or otherwise execute such deed or deeds, transfer or transfers, endorsement or endorsements and to perform such other acts, matters, things as the Attorney shall consider requisite or advisable as full and effectively as the Company could do, if present and acting there.

I, (Name & address of the authorized person to sub-delegate/delegate powers, delegated on him by the Board of Directors) in terms of the powers delegated to me by the Board of Directors of (name of the Co.), do hereby agree that all acts, deeds and

things done by the said Attorney by virtue of this power of attorney, shall be construed as acts, deeds and things done by the Company.

I, (Name & address of the authorized person to sub-delegate/delegate powers, delegated on him by the Board of Directors), further undertake to ratify and confirm whatever our said attorney shall do or cause to be done for the Company, the said Company, in the premises, by virtue of the powers hereby given.

WHEREAS, this sub-delegation is signed and delivered to Shri ---------- (name & designation of the Attorney), on this _____ day of _____, 20___ (Two thousand _____) .

WHEREAS, even though this sub-delegation is signed on this _____ day of _____ 20_____ (Two thousand _____), will have effect from the date he signs and receives this delegation.

IN WITNESS WHEREOF, I, (Name & address of the authorized person to sub-delegate/delegate powers, delegated on him by the Board of Directors) has, this _____ day of _____ 20_____ (Two thousand _____) set my hands and subscribed my signature unto this instrument.

SIGNED AND DELIVERED ON
_____ BY
(Name of authorized person to delegate powers)

WITNESS:

SIGNED AND RECEIVED ON
_____ BY
(Name & designation of Attorney)

Annexure – 3

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

ORGANIZATION DETAILS

CONTACT No.:

NAME OF APPLICANT:

1. Name of the Owner:
2. Address:
   Telephone No. :
   Fax No.
3. Description of Applicant
   (for e.g. General, Civil Engineering
   Contract or Joint Venture/Consortium etc.)
4. Registration and Classification of Contractors:
5. Name and address of bankers:
6. Number of years of experience as a general contractor:-
   In own Country:
   Internationally:
7. Number of years of experience as a sub-contractor:
   Name and Address of partners or associated companies to be involved in the project and whether Parent/Subsidiary/other:
8. Name and address of any associates knowledgeable in the procedures of customs, immigration and local experience in various aspect of the project etc.
9. Name and address of the companies / Sub-contractors who will be involved in the execution of works, namely:

Signature
(Authorised Signatory)

Annexure – 4

NEW MANGALORE PORT AUTHORITY

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

Tenderer shall furnish Details of "eligibility works experience" as per Clause 12(a) of Minimum Eligible Criteria (MEC) of Instruction to Tenderer and certificates in the following format (Client Certificates/work completion certificates or any other documentary evidences with respect to the eligibility work)

ELIGIBLE ASSIGNMENT DETAILS FOR MEC

Assignment Number:

Description	Bidder to fill up the details here
Name and Address of the Client	
Title of the Eligible Assignment	
Date of completion of the Eligible Assignment	
Project Cost	
Reference No of the enclosed work order	
Reference No of the enclosed Client work Completion Certificate	
Reference No of any other documentary evidence; if enclosed.	
Name, telephone no, telefax no and email address of the client's representative	
Description and Scope of Work	

Instructions:

i. Bidders are expected to provide information in respect of Eligible Assignments in this Section. The assignments cited must comply with the criteria specified Clause No. 12.0(a) Minimum eligibility of the "Instructions to Tenderers".
ii. A separate sheet should be filled for each of the eligible assignments.
iii. The details are to be supplemented by documentary proof (Work order and work completion certificate) from the respective client for having carried out such assignment duly certified by clients.
iv. The works indicated in this Annexure – 4 will be only being considered for evaluation. Mere submission of work completion certificate will not be considered as Eligible Assignments.

Signature
(Authorised Signatory)

Annexure – 5

NEW MANGALORE PORT AUTHORITY
"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"
FINANCIAL CAPABLITY

(A) Net worth & Average Annual Turnover of the Bidder

Net Worth	Turnover			
Year 1	Year 1	Year 2	Year 3	Average

Instructions:

Net Worth = (Subscribed and Paid-up Equity + Reserves) - (Revaluation reserves + Miscellaneous expenditure not written off + depreciation not provided for). Year 1 will be the Financial Year 2020-21. Year 2 shall be the year immediately preceding Year 1 and Year 3 shall be the year immediately preceding Year 2. The Bidder shall provide audited Annual Reports as required under this Bid Document.

Net worth & Annual turnover of the bidder shall be submitted duly verified by Charted Accountant or Competent Authority.

(B) (Here specify proposed sources of credit line to meet the Cash flow demand for the work)

Source of Credit line	Amount

There should be a letter from the Bank mentioning that line of credit offered is specifically for this work/contract.

NOTE: If the Tenderer intends to meet the "Cash Flow Demand" for the project through their internal resources without availing the loan of credit, a specific mention to be made to this effect and proof for such resources shall be enclosed.

Certified by C.A Signature
(Authorised Signatory)

Annexure – 6

NEW MANGALORE PORT AUTHORITY
"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

LIST OF ONGOING WORKS IN HAND AT NMPA

The Tenderer shall furnish in the format given below details of works being carried out by him at the time of bidding in NMPA

Sl. No.	Name of work	Work order No. and Date	Value of Work Order in Rs.	Average annual financial turnover as per MEC for the work

Contractor

Annexure – 6A (Not applicable)

NEW MANGALORE PORT AUTHORITY

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

DETAILS OF PROPOSED APPROACH & METHODOLOGY

Bidder shall furnish a detailed method statement (Technical Note) for carrying out of the works, along with a construction programme showing sequence of operation and the time frame for various segments of temporary and permanent works.

Signature
(Authorised Signatory)

Annexure – 7

NEW MANGALORE PORT AUTHORITY

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

--

PLANT AND EQUIPMENT PROPOSED FOR THE WORK

Please indicate the main plant and equipment considered to be necessary for undertaking the work and whether this plant is ready in ownership or will be purchased or hired.

Description of equipment	Requirement no. / capacity	Owned / leased / to be procured	Nos / capacity	Age / condition	Remarks (from whom to be purchased)	At what stage of contract period the equipment will be available

Note: The equipment indicated in the above statement will form part of contract agreement and as such the bidders are requested to indicate the availability of the equipment at site and at what stage of the construction period in a separate column.

Signature

(Authorised Signatory)

Annexure – 8

NEW MANGALORE PORT AUTHORITY

"PROVIDING GALVALUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1"

DECLARATION

We M/s. (Name & address of the bidder) hereby declare that:-

i. I have read the tender document Vol. I (Section I to III) Vol.II (Section IV and V) and Vol. III (Section V and VII) and agreed to the terms and conditions mentioned therein.

ii. All details regarding construction plant, temporary work and personnel for site organization considered necessary and sufficient for the work have been furnished in the Annexures to Conditions of Contract in Volume I and that such plant, temporary works and personnel for site organization will be available at the site till the completion of the respective work.

iii. No conditions are incorporated in the financial bid. In case any conditions are specified in the financial bid, the tender will be rejected summarily without making any further reference to the bidder.

iv. We have not made any payment or illegal gratification to any persons/ authority connected with the bid process so as to influence the bid process and have not committed any offence under PC Act in connection with the bid.

v. We shall undertake that, the Employer i.e. NMPA is indemnified against all damages or compensation payable at Law in respect of or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or Sub-Contractor against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto and the Employer shall be at liberty to deduct or adjust from the Contactor's bills an amount that Employer may be called upon to pay towards claims, demands, proceedings, costs, charges and expenses Whatsoever in respect of or in relation to any accident or injury referred to above without any reference to the Contractor. The contractor shall execute indemnity bond in the prescribed format as per **Annexure - 12**

vi. We shall comply with all the Central State and Municipal Laws and Rules and we

shall be solely responsible for complying with the provisions of the Contract Labour (Regulations & Abolition) Act, 1970 & the contract labour (Regulation &Abolition) Karnataka Rules 1974 and rules there under and the enactments that may be applicable including ESI Act, the payment of wages act, Provident Fund Act, the Minimum Wages Act, the Factory's Act. The Workmen Compensation Act or any other applicable legislation and the Municipal by-laws or other statutory Rules and Regulations whatsoever in force if these are applicable. Any obligations finding or otherwise missed under any statutory enactments, rules & regulations there under shall be the responsibility of the Contractor and the NMPA will take no responsibility for the same. The Contractor should take Workmen's Compensation Policy for his Workers, who are not covered under ESI and submit the same to the EIC immediately after commencement of the work

vii. We undertake that, we are liable to pay all Statutory Compensation to the Labourers/persons engaged by him for the satisfactory execution of the works. If any claim is made against New Mangalore Port Authority on this work, the Port Authority shall have the right to deduct the same from the bill amount payable to the contractor after verification of the validity and if admissible as per rules

viii. *We disclose with that we have made / not made payments or propose to be made to any intermediaries (agents) etc. in connection with the bid.

* Note: Delete whichever is not applicable.

Signature
(Authorised Signatory)

Annexure-9

BID SECURITY (BANK GUARANTEE) (NOT APPLICABLE)

WHEREAS, _____ [Name of Bidder] (hereinafter called "the Bidder") has submitted his bid dated_____ [date] for the Providing Galvalume sheet roofing with G.I pipes over roof slab of Fire service building Near Mallya Gate and Traffic office building at Berth No.1(hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that We _____ [name of bank] of _____ (name of country) having our registered office at _____ (hereinafter called "the Bank") are bound unto _____ [name of Employer] (hereinafter called "the Employer") in the sum of _____ 1 for which payment well and truly to be made to the said Employer the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the said Bank this _____ day of _____ 20 _____

THE CONDITIONS of these obligations are:

(1) If after Bid opening the Bidder withdraws his Bid during the period of bid validity specified in the Form of Bid;

or

(2) If the Bidder having been notified of the acceptance of his Bid by the Employer during the period of bid validity:

(a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to Bidders, if required; or

(b) fails or refuses to furnish the Performance Security, in accordance with the Instructions to Bidders, or

(c) does not accept the correction of the Bid Price pursuant to Clause 27;

We undertake to pay to the Employer up to the above amount upon receipt of his first written demand, without the Employer having to substantiate his demand, provided that in his demand the Employer will note that the amount claimed by him is due to him owing to the occurrence of one or any of the three conditions, specifying the occurred condition or conditions.

This Guarantee will remain in force up to and including the date _____ 2 days after the deadline for submission of Bids as such deadline is stated in the Instructions to

Bidders or as it may be extended by the Employer, notice of which extension(s) to the Bank is hereby waived. Any demand in respect of this Guarantee should reach the Bank not later than the above date.

Notwithstanding anything mentioned above,
Our liability against this guarantee is restricted to Rs ..... (Rupees ..... only) and unless a claim in writing is lodged with us within 3 months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharges.

IN WITNESS WHEREOF this guarantee has been duly executed on this ..... day of ..... 20.....

DATE_____ SIGNATURE OF THE BANK_____

WITNESS_____SEAL_____
_____

_____
[Signature, name and address]

_____ _____ _____ _____ _____

The Bidder should insert the amount of the guarantee in words and figures denominated in Indian Rupees. This figure should be the same as shown in Clause 16 of the Instructions to Bidders.

30 days after the end of the validity period of the Bid. Date should be inserted by the Employer before the Bidding documents are issued.

Annexure-10

DETAILS OF THE PARTY OPTING FOR REFUND OF EMD THROUGH E-PAYMENT SYSTEM FROM NEW MANGALORE PORT AUTHORITY

Name of the Party :

Bank A/c No :

Account type : (Savings / Current / Overdraft)

Bank Name :

Branch :

IFSC Code Number : (11 digit code)

Centre (Location) :

FAX No. :

E-Mail ID : (For forwarding information of remittance)

Mobile No :

Signature of the Party

Annexure-11

FORMAT FOR FURNISHING BANK INFORMATION FOR e-PAYMENT

1	Name and full address of the beneficiary	
2	Credit Account No. (Should be full 14 digit)	
3	Account Type (SB or CA or OD)	
4	Name of the Bank	
5	Branch (Full address with telephone No.)	
6	IFSC Code Number (11 digit)	
7	MICR code (Should be 9 digit)	
8	Telephone/Mobile/Fax No. of the beneficiary	Telephone: Mobile : Fax :
9	Photostat copy of a Cheque	

Signature of the party with seal

Verified the details furnished by the party and it is ascertained that the information furnished are in full shape as required. Xerox copy of a Cheque is also enclosed.

Signature of the HOD/HOO with seal

Annexure 12

INDEMNITY BOND

(To be furnished in Stamp paper not less than Rs.100 e-Stamp paper)

This deed of indemnity is executed by ..... herein after referred to as ' Indemnifier' which expression shall unless repugnant to the context or meaning thereof, include its successors, Administrator, representatives and assignees in favour of New Mangalore Port Authority, Panambur, Mangalore 575010, herein after referred to as 'Indemnified' which expression shall unless repugnant to the context or meaning thereof include its representatives and assignees witnesses as to.

Whereas the indemnified herein as awarded to the indemnifier herein a Tender/Contract or for supply of / Construction of ..... on terms and conditions set out interalia in the work order No..... valued at Rs.....

AND Whereas, the clauses No..... of the above mentioned work order provides for indemnifying the indemnified by the indemnifier for any accident, damage or compensation payable to any workmen or other person in the employment of the contractor or any sub-Contractor during the period of tender/contract.

AND Whereas, the Indemnifier hereby irrevocably agrees to indemnify the indemnified against all damages or compensation payable at law in respect of or in consequence of any accident or injury to any workmen or other person in the employment of the contractor or sub-contractor against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto and the indemnified shall be at liberty to deduct or adjust from the bills payable to the indemnifier by the indemnified for an amount that the indemnified may be called upon to pay towards claims, demands, proceedings, costs, charges and expenses whatsoever in respect of or in relation to any accident or injury referred to above without any reference to the indemnifier.

The Indemnifier shall comply with all the Central State and Muncipal Laws and Rules and shall be solely responsible for complying with the provisions of the Contract Labour (Regulations & Abolition) Act, 1970 & the contract labour (Regulation & Abolition) Karnataka Rules 1974 and rules there under and the enactments that may be applicable including ESI Act, the payment of wages act, Provident Fund Act, the Minimum Wages Act, the Factory's Act, the Workmen Compensation Act or any other applicable legislation and the Muncipal by-laws or other statutory Rules and Regulations whatsoever in force if these are applicable. Any obligations finding or

otherwise missed under any statutory enactments rules & regulations there under shall be the responsibility of the Indemnifier and the Indemnified will have no responsibility for the same. The Indemnifier shall obtain Workmen's Compensation Policy for his workers, who are not covered under ESI and submit the same to the ESIC immediately after commencement of the work.

The Indemnifier is liable to pay all Statutory Compensation to the Labourers / persons engaged by him for the satisfactory execution of the works. If any claim is made against Indemnified arising out of this work, the Port shall have the right to deduct the same from the bill amount payable to the Indemnifier after verification of the validity and if admissible as per rules.

The Indemnifier shall ensure the use of PPE such as helmets, safety shoes, nose masks, hand gloves, safety harness or any other equipment as required depending on nature of work by his staff at site.

In addition to complying of the above, the Indemnifier hereby undertakes to indemnify the indemnified against any unforeseen incidents / accidents, which may lead to fatality including death, permanent/ partial disablement, injury, financial loss, legal issues or any other etc of the labourers / workmen's/ staffs of the contractor / sub-contractor for which the indemnified and its officers / representation are in no way responsible.

For.....

INDEMINIFIER

(Signature with Name and Designation)

Company Seal

Station:

Date:

Witness:

1.....

Signature with Name, Designation & Address

2.....

Signature with Name, Designation & Address

Annexure-13

Format for Self Certification under Preference to “MAKE IN INDIA” Policy

(Refer Clause No. 38 of ITT)

CERTIFICATE

In line with Government Public Procurement Order No. P-45021/2/2017-PP(B-II) dtd. 16-09-2020, as amended from time to time and as applicable on the date of submission of tender, we hereby certify that we M/s_____ (name of the Bidder) are local supplier meeting the requirement of minimum Local content (50%) as defined in above orders for the material against Tender NIT No_____ for the work of _____ _____ _____

Details of location at which local value addition will be made is as follows:

We also understand, false declarations will be in breach of the Code of Integrity under Rule 175(1)(i)(h) of the General Financial Rule for which for which a bidder or its successors can be debarred for up two years as per Rule 151 (iii) of the General Financial Rules along with such other actions as may be permissible under law. Seal and Signature of Authorized Signatory

Signature of the Bidder

Date :

Place :

SECTION - II

iv) FORM OF AGREEMENT

THIS AGREEMENT made the _____ day of _____ 20___ BETWEEN New Mangalore Port Authority (hereinafter called "the Employer") of the one part and _____ _____ _____ _____ (hereinafter called "the Contractor") of the other part WHEREAS the Employer is desirous that certain works should be executed by the Contractor, Viz---------- and has accepted a Tender by the Contractor for the execution and Completion of such works and the remedying of any defects therein at a contract price of Rs ----------

NOW THIS AGREEMENT WITNESSETH as follows:

1. In this Agreement words and expressions shall have the same meanings as are respectively assigned to them in the General Conditions hereinafter referred to.
2. The following documents shall be deemed to form and be read and construed as part of this Agreement, viz.-
   a) The Letter of Acceptance;
   b) The Said Tender (Technical Bid);
   c) The Conditions of Contract (Parts I and II)
   d) The Specifications;
   e) The Drawings;
   f) The Bill of Quantities and
   g) The Addenda
   h) Letters exchanged between the Employer and the Tenderer up to the issue of Letter of Acceptance as separately listed and annexed here to.
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 any defects therein in conformity in all respect 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 and the remedying of defects therein the Contract Price or and 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 the day and year first above written in accordance with their respective laws.

This document contains ..... pages in all. This agreement is assigned No. CEA ..... /20XX-XX.

The Common Seal of

_____

_____

was hereunto affixed in the presence of :

SECTION - III

v) CONDITIONS OF CONTRACT

A. General

1. Definitions

Terms which are defined in the Contract Data are not also defined in the Conditions of Contract but keep their defined meanings. Capital initials are used to identify defined terms.

Bill of Quantities means the priced and completed Bill of Quantities forming part of the Bid.

Compensation Events are those defined in Clause 44.

The Completion Date is the date of completion of the Works as certified by the Engineer or his nominee in accordance with Sub Clause 54

The Contract is the contract between the Employer and the Contractor to execute, complete and maintain the Works. It consists of the documents listed in Clause 2.3 below.

The Contract Data defines the documents and other information which comprise the Contract.

The Contractor is a person or corporate body whose Bid to carry out the Works has been accepted by the Employer.

The Contractor's Bid is the completed Bidding documents submitted by the Contractor to the Employer.

The Contract Price is the price stated in the letter of acceptance and thereafter as adjusted in accordance with the provisions of the Contract.

Days are calendar days, months are calendar months.

A Defect is any part of the Works not completed in accordance with the Contract.

The Defects Liability Period is the period named in the Contract Data and

calculated from the Completion Date.

The Employer is the party who will employ the Contractor to carry out the Works.

Equipment is the Contractor's machinery and vehicles brought temporarily to the Site to construct the Works.

The Initial Contract Price is the Contract Price listed in the Employer's Letter of Acceptance.

The Intended Completion Date is the date on which it is intended that the Contractor shall complete the works. The Intended Completion Date is specified in the Contract Data. The Intended Completion Date may be revised only by the Engineer or his nominee by issuing an extension of time.

Materials are all supplies, including consumables, used by the contractor for incorporation in the Works.

The Engineer or his nominee is the person named in the Contract Data (or any other competent person appointed and notified to the contractor to act in replacement of the Engineer or his nominee) who is responsible for supervising the Contractor, administering the Contract, certifying payments due to the Contractor, issuing and valuing Variations to the Contract, awarding extensions of time and valuing the Compensation Events.

Plant is any integral part of the Works which is to have mechanical, electrical, electronic or chemical or biological function.

The Site is the area defined as such in the Contract Data.

Site Investigation Reports are those which are included in the Bidding documents and are factual interpretative reports about the surface and sub-surface conditions at the site.

Specification means the Specification of the Works included in the Contract and any modification or addition made or approved by the Engineer or his nominee.

The Start Date is given in the Contract Data. It is the date when the Contractor shall commence execution of the works. It does not necessarily coincide with any of the Site Possession Date.

A Subcontractor is a person or corporate body who has a Contract with the Contractor to carry out a part of the work in the Contract which includes work on the Site.

Temporary Works are works designed, constructed, installed and removed by the Contractor which are needed for construction or installation of the Works.

A Variation is an instruction given by the Engineer or his nominee which varies the Works.

The Works are what the Contract requires the Contractor to construct, install and turn over to the Employer as defined in the Contract Data.

The Trained Work Person are those employed / proposed to be employed by the Contractor at the Project Site, who have participated and are in possession of a valid Competency Certificate through a programme run under the auspices of a University, State Technical Board, Ministry of Government of India.

2. Interpretation

2.1 In interpreting these Conditions of Contract, singular also means plural, male also means female or neuter and the other way around. Headings have no significance. Words have their normal meaning under the language of the Contract unless specifically defined. The Engineer or his nominee will provide instructions clarifying queries about the Conditions of Contract.

2.2 If sectional completion is specified in the Contract Data, references in the Conditions of Contract to the Works, the Completion Date, and the Intended Completion Date apply to any Section of the Works (other than references to the Completion Date and Intended Completion date for the whole of the Works).

2.3 The documents forming the Contract shall be interpreted in the following order of priority:

(1) Agreement
(2) Letter of Acceptance and notice to proceed with works
(3) Contractor's Bid
(4) Contract Data
(5) Conditions of Contract including Special Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and
(9) any other documents listed in the Contract Data as forming part of the

Contract.

3. Language and Law

3.1 The language of the Contract and the law governing the Contract are stated in the Contract Data.

4. Engineer or his nominee's Decisions

4.1 Except where otherwise specifically stated, the Engineer or his nominee will decide contractual matters between the Employer and the Contractor in the role representing the Employer.

5. Delegation

5.1 The Engineer or his nominee may delegate any of the duties and responsibilities to other people after notifying the Contractor and may cancel any delegation after notifying the Contractor.

6. Communications

Communications between parties which are referred to in the conditions are effective only when in writing. A notice shall be effective only when it is delivered (in terms of Indian Contract Act 1872).

7. Contract Agreement

A suitable form is annexed as "FORM OF AGREEMENT" to the Contract Document. Upon signing the Contract Agreement, the Contractor shall make 12 copies of Contract Documents in hardbound cover which shall cover documents used in Contract/Agreement and provide the same to the Employer at no extra cost.

Data made available by the Employer in accordance with provisions of the Condition of Contract shall be deemed to include data listed elsewhere in the Contract and open for inspection at the office of the Deputy Chief Engineer (Civil) of the New Mangalore Port Authority (by prior appointment with the Engineer). Within 21 days of receipt of Letter of Acceptance, the successful bidder shall furnish the performance security and sign the Agreement with the Employer. However No work shall be commenced before signing of contract Agreement.

8. Subcontracting

8.1 The Contractor may subcontract with the approval of the Engineer or his nominee but may not assign the Contract without the approval of the Employer in writing. Subcontracting does not alter the Contractor's obligations.

Other Contractors

8.2 The Contractor shall co-operate and share the site with other contractors, public authorities, utilities, and the Employer between the dates given in the Schedule of other contractors. The Contractor shall as

referred to in the Contract Data, also provide facilities and services for them as described in the Schedule. The employer may modify the schedule of other contractors and shall notify the contractor of any such modification.

9. Personnel

9.1 The Contractor shall employ the key personnel named in the Schedule of Key Personnel as referred to in the Contract Data to carry out the functions stated in the Schedule or other personnel approved by the Engineer or his nominee. The Engineer or his nominee will approve any proposed replacement of key personnel only if their qualifications, abilities, and relevant experience are substantially equal to or better than those of the personnel listed in the schedule.

9.2 If the Engineer or his nominee asks the contractor to remove a person who is a member of the contractor's staff of his work force stating the reasons, the contractor shall ensure that the person leaves the site within seven days and has no further connections with the work in the contract.

10. Employer's and Contractor's Risks

10.1 The Employer carries the risks which this Contract states are Employer's risks and the contractor carries the risks which this Contract states are contractor's risks.

11. Employer's Risks

11.1 The Employers risks are

a) In so far as they directly affect the execution of the Works in the country where the Permanent Works are to be executed:

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; and

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;

vi) Unforeseen Rains (Rains if any; during the period other than the Monsoon period as stated in the Tender), floods, tornadoes, earthquakes and landslides.

b) loss or damage due to the use or occupation by the Employer of any Section or part of the Permanent Works, except as may be provided for in the Contract;

c) loss or damage to the extent that it is due to the design of the Works, other than any part of the design provided by the Contractor or for which the Contractor is responsible; and

d) any operation of the forces of nature (in so far 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.

12. Contractor's Risks

12.1 All risks of loss of or damage to physical property and of personal injury and death which arise during and in consequence of the performance of the Contract other than the excepted risks are the responsibility of the Contractor.

13. Insurance

13.1 The Contractor shall provide in the joint names of the Employer and the Contractor, insurance cover from the Start Date to the end of the Defects Liability Period, in the amounts and deductibles stated in the Contract Data for the following events which are due to the Contractors risks.

a) loss of or damage to the Works, Plant and Materials

b) loss of or damage to Equipment;

c) loss of or damage of property (except the Works, Plant, Materials and Equipment) in connection with the Contract; and

d) personal injury or death.

13.2 Policies and certificates for insurance shall be delivered by the contractor to the Engineer or his nominee for the Engineer or his nominee's approval before the start date. All such insurances shall provide for compensation to be payable in the types and proportions of currencies required to rectify the loss or damage incurred.

13.3 If the contractor does not provide any of the policies and certificates required, the Employer may affect the insurance which the contractor

should have provided and recover the premiums the Employer has paid from payments otherwise due to the contractor or, if no payment is due, the payment of the premiums shall be a debt due.

13.4 Alterations to the terms of insurance shall not be made without the approval of the Engineer or his nominee.

13.5 Both parties shall comply with all conditions of the insurance policies.

14. Site Investigation Reports

The Contractor, in preparing the Bid, shall rely on the Site Investigation Report referred to in the Contract Data, supplemented by any information available to the Bidder.

15. Queries about the Contract Data

The Engineer or his nominee will clarify queries on the Contract Data.

16. Contractor to Construct the Works

The Contractor shall construct and install the works in accordance with the Specification and Drawings.

17. The Works to Be Completed by the Intended Completion Date

The Contractor may commence execution of the works on the Start Date and shall carry out the works in accordance with the program submitted by the contractor as updated with the approval of the Engineer or his nominee, and complete them by the Intended Completion Date.

18. Approval by the Engineer or his nominee

18.1 The Contractor shall submit Specifications and Drawings showing the proposed Temporary Works to the Engineer or his nominee, who is to approve them if they comply with the specifications and Drawings.

18.2 The Contractor shall be responsible for design of Temporary Works.

18.3 The Engineer or his nominee's Approval shall not alter the contractor's responsibility for design of the Temporary Works.

18.4 All Drawings prepared by the contractor for the execution of the temporary or permanent Works, are subject to prior approval by the Engineer or his nominee before their use.

19. Safety

The contractor shall be responsible for the safety of all activities on the Site.

20. Discoveries

Anything of historical or other interest or of significant value unexpectedly

discovered on the Site is the property of the Employer. The Contractor is to notify the Engineer or his nominee of such discoveries and carry out the Engineer or his nominee's instructions for dealing with them.

21. Possession of the Site

The Employer shall give possession of all parts of the Site to the Contractor, free from encumbrances. If possession of a part is not given by the start date stated in the Contract Data the Employer is deemed to have delayed the start of the relevant activities and this will be a Compensation Event.

22. Access to the Site

The Contractor shall allow the Engineer or his nominee and any person authorised by the Engineer or his nominee access to the Site to any place where work in connection with the Contract is being carried out or is intended to be carried out and to any place where materials or plant are being manufactured, fabricated and/or assembled for the works.

23. Instructions

The Contractor shall carry out all instructions of the Engineer or his nominee which comply with the applicable laws where the Site is located.

24. Disputes

If the Contractor believes that a decision taken by the Engineer or his nominee was either outside the authority given to the Engineer or his nominee by the Contract or that the decision was wrongly taken, the decision shall be referred to the Dispute Review Board (DRB) within 28 days of the notification of the Engineer or his nominee's decision.

25. Settlement of Disputes

25.1 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 after termination of the Contract, including any disagreement by either party with any action, inaction, opinion, instruction, determination, certificate or valuation of the Engineer or his nominee, the matter in dispute shall, in the first place be referred to the Disputes Review Board [DRB] established pursuant to Appendix 1 hereto. (Not applicable to this contract)

Unless the Contract has already been repudiated or terminated or frustrated 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 decision of the Engineer or his nominee unless and until the same shall be revised, as hereinafter provided, in a Dispute Review Board Recommendation / Arbitral Award.

25.2. Arbitration

Any dispute in respect of in respect of contracts where party is dissatisfied by the Dispute Review Board's (DRB) decision shall be decided by arbitration as set forth below:

i) A dispute with contractor shall be finally settled by arbitration in accordance with the Indian Arbitration and Conciliation Act, 1996, or any statutory amendment thereof. The arbitral tribunal shall consist of 3 arbitrators, one each to be appointed by the Employer and the contractor, and the third to be appointed by the mutual consent of both the arbitrators, failing which by making a reference to CIDC-SIAC Arbitration Center from their panel.

ii) Neither party shall be limited in the proceedings before such arbitrators to the evidence or arguments already put before the Engineer or his nominee or the Board, as the case may be, for the purpose of obtaining said recommendations/decision. No such recommendations/decision shall disqualify the Engineer or his nominee or any of the members of the Board, as the case may be, from being called as a witness and giving evidence before the arbitrators or any matter whatsoever relevant to the dispute.

iii) The reference to arbitration shall proceed notwithstanding that the works shall not then be or be alleged to be complete, provided always that the obligations of the Employer, the Engineer or his nominee and the Contractor shall not be altered by reason of the arbitration being conducted during the progress of the works. Neither party shall be entitled to suspend the works to which the dispute relates, and payment to the Contractor shall be continued to be made as provided by the contract.

iv) If one of the parties fails to appoint its arbitrators in pursuance of sub-clause [i], within 14 days after receipt of the notice of the appointment of its arbitrator by the other party, then President/Chairman of the nominated Institution shall appoint arbitrator within 14 days of the receipt of the request by the nominated institution. A certified copy of the President's/ Chairman's order, making such an appointment shall be furnished to both the parties.

v) Arbitration proceedings shall be held at Mangalore, and the language of the arbitration proceedings and that of all documents and communications between the parties shall be 'English

vi) The Arbitration shall be conducted by the experts from the panel of

CIDCSIAC Arbitration Center.

vii) The decision of the majority of arbitrators shall be final and binding upon both parties. The expenses of the arbitrators as determined by the arbitrators shall be shared equally by the Employer and the Contractor. However, the expenses incurred by each party in connection with the preparation, presentation, etc. of its case prior to, during and after the arbitration proceedings shall be borne by each party itself.

viii) All arbitration awards shall be in writing and shall state the reasons for the award.

ix) Performance under the contract shall continue during the arbitration proceedings and payments due to the contractor by the Employer shall not be withheld, unless they are subject matter of the arbitration proceedings.

26. Replacement of conciliator (deleted)

B. TIME CONTROL

27. Program

27.1 Within the time stated in the Contract Data the Contractor shall submit to the Engineer or his nominee for approval a Program showing the general methods, arrangements, order, and timing for all the activities in the works along with monthly cash flow forecast.

27.2 An update of the Program shall be a program showing the actual progress achieved on each activity and the effect of the progress achieved on the timing of the remaining work including any changes to the sequence of the activities.

27.3 The Contractor shall submit to the Engineer on the first day of each week or such longer period as the Engineer may from time to time direct, a progress report in an approved form showing up-to-date total progress, progress achieved against planned progress, during the previous week and progress forecast for the following week for all important items in each section or portion of the Works, in relation with the approved Program.

27.4 The Contractor shall submit to the Engineer or his nominee, for approval an updated Program at intervals no longer than the period stated in the Contract Data. If the Contractor does not submit an updated Program within this period, the Engineer or his nominee may withhold the amount stated in the Contract Data from the next payment certificate and continue to withhold this amount until the next payment after the date on which the overdue Program has been submitted.

28. Revised Program

The Engineer or his nominee's approval of the Program shall not alter the Contractor's obligations. The Contractor may revise the Program and submit it to the Engineer or his nominee again at any time. A revised Program is to show the effect of Variations and Compensation Events.

29. Extension of the Intended Completion Date

29.1 The Engineer or his nominee shall extend the Intended Completion Date if a Compensation Event occurs or a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date without the Contractor taking steps to accelerate the remaining work and which would cause the Contractor to incur additional cost.

29.2 The Engineer or his nominee shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Engineer or his nominee for a decision upon the effect of a Compensation Event or Variation and submitting full supporting information. If the Contractor has failed to give early warning of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date.

30. Delays Ordered by the Engineer or his nominee

The Engineer or his nominee may instruct the Contractor to delay the start or progress of any activity within the Works.

31. Management Meetings

31.1 Either the Engineer or his nominee or the Contractor may require the other to attend a management meeting. The business of a management meeting shall be to review the plans for remaining work and to deal with matters raised in accordance with the early warning procedure.

31.2 The Engineer or his nominee shall record the business of management meetings and is to provide copies of his record to those attending the meeting and to the Employer. The responsibility of the parties for actions to be taken is to be decided by the Engineer or his nominee either at the management meeting or after the management meeting and stated in writing to all who attended the meeting.

32. Early Warning

32.1 The Contractor is to warn the Engineer or his nominee at the earliest opportunity of specific likely future events or circumstances that may adversely affect the quality of the work, increase the Contract Price or delay the execution of works. The Engineer or his nominee may require the Contractor to provide an estimate of the expected effect of the event or circumstance on the Contract Price and Completion Date. The estimate is to be provided by the Contractor as soon as reasonably possible.

32.2 The Contractor shall cooperate with the Engineer or his nominee in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer or his nominee.

C. QUALITY CONTROL

33. Identify Defects

The Engineer or his nominee shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer or his nominee may instruct the Contractor to search for a Defect and to uncover and test any work that the Engineer or his nominee considers may have a Defect.

34. Tests

If the Engineer or his nominee instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the test shows that it does the Contractor shall pay for the test and any samples. If there is no Defect the test shall be a Compensation Event.

35. Defect Liability

35.1 The Engineer or his nominee shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins at Completion and is defined in the Contract Data. The Defects Liability Period shall be extended for as long as Defects remain to be corrected.

35.2 Every time notice of a Defect is given, the Contractor shall correct the notified defect within the length of time specified by the Engineer or his nominee's notice. 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 within the date to be intimated by the engineer 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.

35.3 Cost of Remedying Defects

All work referred to in Sub-Clause 35.2 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, or

b) Where the Contractor is responsible for the design of part of the

Permanent Works, any fault in such design, or 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.

35.4 Defects Liability Certificate

The Contract shall not be considered as completed until a Defects Liability Certificate shall have been signed by the Engineer and delivered to the Employer, with a copy to the Contractor, stating the date on which the Contractor shall have completed his obligations to execute and complete the Works and remedy any defects therein to the Engineer's satisfaction. The Defects Liability Certificate shall be given by the Engineer within 28 days after the expiration of the Defects Liability Period, or, if different defects liability periods shall become applicable to different Sections or parts of the Permanent Works, the expiration of the latest such period, or as soon thereafter as any works instructed, pursuant to Clauses 35, have been completed to the satisfaction of the Engineer.

35.5 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 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.

36. Uncorrected Defects.

If the Contractor has not corrected a Defect within the time specified in the Engineer or his nominee's notice the Engineer or his nominee will assess the cost of having the Defect corrected, and the Contractor will pay this amount.

D. COST CONTROL

37. Bill of Quantities

37.1 The Bill of Quantities shall contain items for the construction, supply, installation, testing and commissioning work to be done by the Contractor.

37.2 The Bill of Quantities is used to calculate the Contract Price. The Contractor is paid for the quantity of the work done at the rate in the Bill of Quantities for each item.

38. Changes in the Quantities

38.1 If the final quantity of the work done differs from the quantity in the Bill of Quantities for the particular item by more than +25 % provided the change exceeds +10% of initial Contract Price, the Engineer or his nominee shall adjust the rate(s), to allow for the change.

38.2 The Engineer or his nominee shall not adjust rates from changes in quantities if thereby the Initial Contract Price is exceeded by more than 15 percent except with the Prior approval of the Employer.

38.3 If requested by the Engineer or his nominee where the quoted rate(s) of any item(s) is abnormally high, the Contractor shall provide the Engineer or his nominee with a detailed cost breakdown of such rate in the Bill of Quantities.

39. Variations

39.1 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,
c) change the character or quality or kind of any such work,
d) change the levels, lines, position and dimension of any part of the Works,
e) execute additional work of any kind necessary for the completion of the Works,
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, by the effect, if any, of all such variations shall be valued in accordance with Clause 40. 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. All Variations shall be included in updated Programs produced by the contractor.

39.2 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.

40. Payments for Variations

40.1 Variation permitted shall not exceed +25% in quantity of each individual item, and +10% of the total contract price. Within 14 days of the date of instruction for executing varied work, extra work or substitution, and before the commencement of such work, notice shall be given either (a) by the contractor to the Employer of his intention to claim extra payment or a varied rate or price, or (b) by the Employer to the contractor of his intention to vary rate or price.

40.2 For items not existing in the Bill of Quantities or substitution to items in the Bill of Quantities, rate payable should be determined by methods given below and in the order given below:

i) Rates and prices in Contract, if applicable plus escalation as per contract.

ii) Rates and prices in the Schedule of Rates applicable to the Contract plus ruling percentage.

iii) Market rates of materials and labor, hire charges of plant and machinery used, plus 10% for overheads and profits of contractor.

40.3 For items in the Bill of Quantities but where quantities have increased beyond the variation limits, the rate payable for quantity in excess of the quantity in the Bill of Quantity plus the permissible variation should be:

i) Rates and prices in contract, if reasonable plus escalation, failing which (ii) and (iii) below will apply

ii) Rates and prices in the schedule of Rates applicable to the contract plus ruling percentage.

iii) Market rates of material and labor, hire charges of plant and machinery used plus 10% for overheads and profits of contractor.

40.4 If there is delay in the Employer and the Contractor coming to an agreement on the rate of an extra item, rates as proposed by the

Employer shall be payable provisionally till such time as the rates are finally determined or till date mutually agreed.

40.5 If the Engineer or his nominee decides that the urgency of varying the work prevent a quotation being given and considers not delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.

41. Cash flow forecasts

41.1 When the Program is updated, the contractor is to provide the Engineer or his nominee with an updated cash flow forecast.

42. Payment Certificates

42.1 The Contractor shall submit to the Engineer or his nominee monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

42.2 The Engineer or his nominee shall check the Contractors' monthly statement within 14 days and certify the amount to be paid to the Contractor after taking into account any credit or debit for the month in question in respect of materials for the works in the relevant amounts and under conditions set forth in sub-clause 51.6 of the Contract Data (Secured Advance).

42.3 The value of work executed shall be determined by the Engineer or his nominee.

42.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of quantities completed.

42.5 The value of work executed shall include the valuation of variations and Compensation Events.

42.6 The Engineer or his nominee may exclude any item certified in a previous certificate or reduce the proportion of any item previously certified in any certificate in the light of later information.

43. Payments

43.1 The bills for other Construction/Renovation/Miscellaneous works which are not paid on monthly basis the Contractor has to submit the bill within 7 days of joint measurement taken along with the concerned Engineer. The Engineer has to ensure that joint measurement to be completed within 7 days of completing of part work / running work. The concerned Engineer i/c shall check and make entries into bill/M.B within 10 days of submission of the interim bill and submit to Executive Engineer/ Superintending Engineer (Civil). The Executive Engineer/ Superintending Engineer (Civil) shall check the bills and after certification of the quantities as per manual shall forward to the Finance Department within 3 working days. The Contractor and Assistant Engineer both jointly complete the measurements, if Contractor due to any reason does not attend/avoid joint survey/measurements the Executive Engineer shall give notice to the contractor to be present at the site for joint measurement within 7 days notice. If the contractor fails to attend the joint measurement second notice shall be issued to the contractor to attend the joint measurement within 3 days failure to attend the site for joint measurement the Assistant Engineer and AEE or EE would record the reason and complete the measurements in a transparent manner departmentally and submit the bill.

Bills / Tax invoice shall be prepared and submitted by the Contractor. Joint measurements shall be taken continuously and need not be connected with billing stage. System of 4 copies of measurements, one each for Contractor, Employer and Engineer or his nominee, and signed by both Contractor and Employer shall be followed.

43.2 Interim of bill amount will be paid within 14 days of submission of the bill.

43.3 Contractor shall submit final Bill within 60 days from the date of completion of work and the same will be paid by the Port within 30 days from the date of submission

43.4 The payment will be made to the contractor after deducting any dues payable to the Port statutory authorities etc

43.5 If an amount certified is increased in a later certificate as a result of an award by the DRB or an Arbitrator, the Contractor shall be paid interest upon the delayed payment as set out in this clause. Interest shall be calculated from the date upon which the increased amount would have been certified in the absence of dispute.

43.6 Items of the Works for which no rate or price has been entered in will not be paid for by the Employer and shall be deemed covered by other rates

and prices in the Contract.

44. Compensation Events

44.1 The following mutually agreed Compensation Events unless they are caused by the Contractor would be applicable:

(a) The Employer does not give access to a part of the Site by the Site Possession Date stated in the Contract Data.

(b) The Employer modifies the schedule of other contractors in a way which affects the work of the contractor under the contract.

(c) The Engineer or his nominee orders a delay or does not issue drawings, specifications or instructions required for execution of works on time.

(d) The Engineer or his nominee instructs the Contractor to uncover or to carry out additional tests upon work which is then found to have no Defects.

(e) The Engineer or his nominee unreasonably does not approve for a subcontract to be let.

(f) Ground conditions are substantially more adverse than could reasonably have been assumed before issuance of Letter of Acceptance from the information issued to Bidders (including the Site Investigation Reports), from information available publicly and form a visual inspection of the site.

(g) The Engineer or his nominee gives an instruction for dealing with an unforeseen condition, caused by the Employer, or additional work required for safety or other reasons.

(h) Other contractors, public authorities, utilities or the Employer does not work within the dates and other constraints stated in the Contract that cause delay or extra cost to the Contractor.

(i) The effect on the Contractor of any of the Employer's Risks.

(j) Other Compensation Events listed in the Contract Data or mentioned in the contract.

Whenever any compensation event occurs, the contractor will notify the employer, within 14 days and provide a forecast cost of the compensation event.

44.2 If a Compensation Event would cause additional cost or would prevent the work being completed before the Intended Completion Date, the Contract Price shall be increased and/or the Intended Completion Date shall be extended. The Engineer or his nominee shall decide whether and by how much he Contract Price shall be increased and whether and by how much the Intended Completion Date shall be extended.

44.3 As soon as information demonstrating the effect of each Compensation

Event upon the Contractor's forecast has been provided by the Contractor, it is to be assessed by the Engineer or his nominee and the Contract Price shall be adjusted accordingly. If the Contractor's forecast is deemed unreasonable the Engineer or his nominee shall adjust the Contract Price based on Engineer or his nominee's own forecast. The Engineer or his nominee will assume that the Contractor will react competently and promptly to the event.

45. Tax

45.1 The rates quoted by the Contractor to be inclusive of taxes if any excluding GST that the Contractor will have to pay for the performance of this Contract. The Employer will perform such duties in regard to the deduction of such taxes at sources as per applicable law. Any new Taxes, levies, duties imposed after signing the Contract shall be reimbursed by the employer on production of documentary evidence. The GST shall be quoted separately in tax invoice. The contractor shall file the applicable returns with tax department in time and submit the same as documentary evidence.

46. Currencies

46.1 All payments shall be made in Indian Rupees unless specifically mentioned.

47. Price Adjustment. (Not Applicable)

48. Retention

48.1 The Employer shall retain from each payment due to the Contractor the proportion stated in the Contract Data until Completion of the whole of the Works.

48.2 Retention Money shall be deducted at the rate of 10% of the toatal tax invoice, from first Running Bill onwards subject to a max of 5% plus of the contract price including GST. Retention money shall be refunded after completion of defect liability period along with performance security.

49. Liquidated Damages

49A In case of delay in completion of the contract, liquidated damages (L.D) may be levied at the rate of half per cent (½%) of the contract price per week of delay, or part thereof subject to a maximum of 10 per cent of the contract price.

49A(i) The Employer, if satisfied, that the works can be completed by the

contractor within a reasonable time after the specified time for completion, may allow further extension of time at its discretion with or without the levy of L.D. In the event of extension granted being with L.D, the Employer will be entitled without prejudice to any other right or remedy available in that behalf, to recover from the contractor as agreed damages equivalent to half per cent (½%) of the contract value of the works including GST for each week or part of the week subject to the ceiling defined in sub-Clause 49 A.

In the event of forfeiting the LD / EMD / SD performance Guarantee and while imposing penalty GST at applicable rate is applicable.

49A(ii) The Employer, if not satisfied that the works can be completed by the contractor, and in the event of failure on the part of the contractor to complete work within further extension of time allowed as aforesaid, shall be entitled, without prejudice to any other right, or remedy available in that behalf, to rescind the contract.

49A(iii) The Employer, if not satisfied with the progress of the contract and in the event of failure of the contractor to recoup the delays in the mutually agreed time frame, shall be entitled to terminate the contract.

49A(iv) In the event of such termination of the contract as described in clauses 49A(ii) or 49A(iii) or both the Employer shall be entitled to recover L.D. up to ten per cent (10%) of the contract value and forfeit the security deposit made by the contractor besides getting the work completed by other means at the risk and cost of the contractor.

49A(v) In case Part / portions of the work can be commissioned and the Port operates the portion for commercial purposes, the rate of LD will be restricted to the uncompleted value of work, the maximum LD being on the entire contract value.

50. Nominated Subcontractors

All specialists, merchants, tradesmen and others executing any work or supplying any good, 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”.

51. Advance payment (Not Applicable)

The Employer shall make the following advance payments:

51.1 Mobilisation Advance shall be paid up to 10% of Contract price, payable in two equal installments. The first installment shall be paid after mobilisation has started and next installment shall be paid after satisfactory utilisation of earlier advance.

51.2 Construction / installation equipment Advance shall be paid up to 5% of Contract price, limited to 90% of assessed cost of machinery.

51.3 Mobilisation Advance and Construction Equipment Advance shall be paid at SBI PLR + 2% p.a. (as on date of payment) interest rate at the discretion of the employer and against Bank Guarantee for Mobilisation Advance and against hypothecation of Construction Equipment to the Employer.

51.4 Equipment advance will be paid in two or more installments. First installment shall be paid after Construction Equipment has arrived at the site and next installment shall be paid after satisfactory utilisation of earlier advance (s).

51.5 Recovery of Mobilisation and Construction Equipment advance will start when 15% of the work is executed and recovery of total advance should be completed by the time 80% of the original Contract work is executed.

51.6 Secured Advance: The Engineer or his nominee shall make advance payment in respect of materials and plant brought to site but not yet incorporated and installed in the Works in accordance with conditions stipulated in the Contract Data.

75% of cost of materials and plant brought to site for incorporation into the works only shall be paid as Secured Advance. Materials which are of perishable nature should be adequately insured.

52. Securities

52.1 Security deposit shall consist of two parts

a) Performance security to be submitted at award of the work

b) Retention Money to be recovered from Running Bills.

52.2 The Security deposit at 8% of the contract amount including GST, of which 3% of contract price should be submitted as Bank Guarantee within 21 days of receipt of letter of acceptance and balance 5%

recovered as retention money from running bills. Recovery of 5% of retention money shall commence from the first RA bill onwards @ 10% for each bill. Retention money shall be refunded after completion of defect liability period. The performance Bank Guarantee will be released after completion of defect liability period.

53. Removal of Craft or Plant which has sunk (not applicable to this contract)

The Contractor shall forthwith and with dispatch at his own cost raise and remove any craft or plant (floating or otherwise) belonging to him or to any sub-contractor employed by him (including also any plant which is held by the Contractor or any sub-contractor under agreement for hire or hire-purchase) which may be sunk in the course of the construction completion or maintenance of the Works or otherwise deal with the same as the Engineer may direct or until the same shall be raised and removed, the contractor shall set al such buoys and display at night such lights and do all such things for the safety of navigation as may be required by the Engineer or by Employer. In the event of the Contractor not carrying out his obligation imposed upon him by this clause the Employer may provide buoy and light such sunken craft or plant and raise and remove the same (without prejudice to the right of the Employer to hold the Contractor liable under General Conditions) and the Contractor shall refund to the Employer all costs incurred in connection therewith.

Contractor's Temporary Moorings

Should the Contractor need, in connection with implementing the Works, to provide temporary moorings for his craft he may be allowed to do so in location and manner approved by the Engineer subject to all necessary permissions being first obtained by the Contractor from the authorities concerned. The Contractor shall not lay his temporary moorings such as to interfere with the port traffic and such moorings shall be removed if and when required by the Employer.

54. Cost of Repairs

53.1 Loss or damage to the Works or Materials to be incorporated in the Works between the Start Date and the end of the Defects Correction period shall be remedied by the Contractor at the Contractor's cost if the loss or damage arises from the Contractor's acts or omissions.

E. FINISHING THE CONTRACT

55. Completion

After completion of the work, the contractor will serve a written notice to the Engineer or his nominee/Employer to this effect. The Engineer or his nominee/Employer upon receipt of this notice shall conduct a complete joint survey of the work within 7 days and prepare a defects list jointly. The defects pointed out by the Engineer or his nominee/Employer would be rectified by the contractor within 14 days and thereafter acceptance report be signed jointly by the contractor and the Employer. This joint acceptance report shall be treated as 'Completion Certificate'.

Substantial Completion of Parts

If any part of the Permanent Works has been substantially completed and satisfactorily passed any Tests on Completion prescribed by the Contract, 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.

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.

56. Taking Over

The Employer shall take over the Site and the Works within seven days of the Engineer or his nominee issuing a certificate of Completion.

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 instruction in writing to the Contractor

specifying all the work which in the Engineer's opinion, is required to be done by the Contractor before the issue of such Certificate. The Engineer shall also notify the Contractor of any defects in the Works affecting substantial completion that may appear after such instructions and before completion of the Works specified therein. The Contractor shall be entitled to receive such Taking-Over Certificate within 21 days of completion, to the satisfaction of the Engineer, of the Works so specified and remedying any defects so notified.

Taking Over of Sections or Parts

Similarly, in accordance with the procedure set out in above Clause, 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, or

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).

57. Final Account

The Contractor shall supply to the Engineer or his nominee a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer or his nominee shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 60 days of receiving the Contractor's account if it is correct and complete. If it is not, the Engineer or his nominee shall issue within 15 days a schedule that states the scope of the corrections or additions that are necessary for the correction and certify payment of 50% of the undisputed amount to the contractor. If the Final Account is still unsatisfactory after it has been resubmitted the Engineer or his nominee shall decide on the amount payable to the Contractor and issue a payment certificate, within 60 days of receiving the Contractor's revised account.

58. Submission of 'As built Drawings'

"As built" Drawings are required to be submitted by the Contractor and shall be supplied by them by the dates stated in the Contract Data. If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer or his

nominee's approval, the Engineer or his nominee shall withhold the amount stated in the Contract Data from payments due to the Contractor.

59. Termination

59.1 The Employer or the Contractor may terminate the Contract if the other party causes a fundamental breach of the Contract.

59.2 Fundamental breaches of Contract include, but shall not be limited to the following:

(a) The Delay in signing of contract agreement beyond prescribed time limit.

(b) the Contractor stops work for 28 days when no stoppage of work is shown on the current Program and the stoppage has not been authorized by the Engineer or his nominee.

(c) the Engineer or his nominee instructs the Contractor to delay the progress of the Works and the instruction is not withdrawn within 28 days.

(d) the Employer or the Contractor becomes bankrupt or goes into liquidation other than for a reconstruction restructure or amalgamation.

(e) a payment certified by the Engineer or his nominee is not paid by the Employer to the Contractor within 50 days of the date of the Engineer or his nominee's certificate:

(f) the Engineer or his nominee gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer or his nominee.

(g) the Contractor does not maintain a security which is required.

(h) the Contractor has delayed the completion of works by the number days for which the maximum amount of liquidated damages can be paid as defined in the Contract data and

(i) if the Contractor, in the judgment of the Employer has engaged in corrupt or fraudulent practices in competing for or in the executing the Contract.

For the purpose of this paragraph: "corrupt practice" means the offering, giving, receiving or soliciting of any thing of value to influence the action of a public official in the procurement process or in contract execution. "Fraudulent practice" means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of the Employer, and includes collusive practice. Bidders (prior to or after bid submission) designed to establish bid prices at artificial non-competitive levels and to deprive the Employer of the benefits of free

and open competition."

59.3 When either party to the Contract gives notice of a breach of contract to the Engineer or his nominee for a cause other than those listed under Sub Clause 59.2 above, the Engineer or his nominee shall decide whether the breach is fundamental or not.

59.4 Notwithstanding the above, the Employer may terminate the Contract for convenience subject to payment of compensation to the contractor including loss of profit on uncompleted works. Loss of profit shall be calculated on the same basis as adopted for calculation of extra/additional items.

59.5 If the Contract is terminated the Contractor shall stop work immediately, make the Site safe and secure and leave the Site as soon as reasonably possible.

60. Payment upon Termination

60.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer or his nominee shall issue a certificate for the value of the work done less advance payments received up to the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less the percentage to apply to the work not completed as indicated in the Contract Data. Additional Liquidated Damages shall not apply. If the total amount due to the Employer exceeds any payment due to the Contractor, the difference shall be a debt payable to the Employer.

60.2 If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer or his nominee shall issue a certificate for the value of the work done, the reasonable cost of removal of Equipment repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the Works and loss of profit on uncompleted works less advance payments received up to the date of the certificate, less other recoveries due in terms of the contract and less taxes due to be deducted at source as per applicable law.

61. Property

All materials on the Site, Plant, Equipment, Temporary Works and Works for which payment has been made to the contractor by the Employer, are deemed to be the property of the Employer, if the Contract is terminated because of a Contractor's default.

62. Release from Performance

If the Contract is frustrated by the outbreak of war or by other event entirely outside the control of either the Employer or the Contractor, the Engineer or his nominee shall certify that the Contract has been frustrated. The Contractor shall leave the Site and stop work as quickly as possible after receiving this certificate and shall be paid for all work carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. SPECIAL CONDITIONS OF CONTRACT

The conditions of contract shall be the general conditions of contract in Section-III (v) as modified or added by the following condition of special conditions as provided in Section – III(vi) herein, which shall be read and construed with the general condition in Section – 3 A to E as if they were incorporated therein. In so far as any of the condition of the special conditions may conflict or be in consisting with any of general conditions of in Section -3F- Special condition of the contract shall prevail.

63. 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.

The Contractor shall, if required by the Engineer or his nominee, deliver to the Engineer or his nominee a return in detail, in such form and at such intervals as the Engineer or his nominee 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 other information as the Engineer or his nominee may require.

64. Compliance with labour regulations

During continuance of the contract, the Contractor and his sub contractors shall abide at all times by all existing labour enactment and rules made there under, regulations, notifications and bye laws of the State or Central Government or local authority and any other labour law (including rules) regulations, bye laws that may be passed or notification that may be issued under any labour law in future either by the State or Central Government or the local authority. Salient features of some of the major labour laws that are applicable to construction industry are given below. The Contractor shall keep the Employer indemnified in case any action is taken against the Employer by the competent authority on account of contravention of any of the provisions of any Act or rules made there under, regulations or notifications including amendments. If the Employer is caused to pay or reimburse such amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the Contractor the Engineer or his nominee/Employer shall have the right to deduct any money due to the Contractor including his amount of performance security. The Employer / Engineer or his nominee shall also have right to recover from the Contractor any sum required or estimated to be required for making good the loss or

damage suffered by the Employer.

The employees of the Contractor and the Sub-Contractor in no case shall be treated as the employees of the Employer at any point of time.

65. Safety, Security and Protection of the Environment.

Subject and without prejudice to any other provision of the Contract, the Contractor shall take all reasonable precautions:

(a) In connection with underground water resources (including percolating water) to prevent

  (j) Any interference with the supply to or abstraction from such sources

  (ii) Pollution of the water so as to affect adversely the quality thereof.

(b) All works shall be carried out without unreasonable noise and disturbance. The Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims, demands, proceedings, damages, costs, charges and expenses whatsoever in regard or in relation to such liability.

(c) The Contractor at his own cost shall make such provisions for lighting of Works, Temporary Works, Materials and Plant and shall provide all such marks and lights as may be required by the Employer or the Engineer or any other authority having jurisdiction over the Site together with all labour stores and services required for their efficient working and use at any time, day or night.

(d) The Contractor shall also provide at his own cost every description of watching and maintenance required in connection with the foregoing, and all other services for protecting and securing all places dangerous whether to Contractor's workmen or to other persons until the Works are handed over to the Employer, or till such time when the Engineer decides that such services are no longer required.

All lights provided by the Contractor shall be placed or screened such as not to interfere with any navigation lights or with any traffic or signal lights of any local or other authority.

66. Insurance of Works and Contractor’s Equipment

The Insurance shall be issued by Nationalized Insurance Company from its Mangalore Branch which has been determined by the Contractor to be acceptable to the Employer.

The contractor shall at his own costs and expenses obtain and shall cause any subcontractor to obtain such insurance as may be necessary to cover the liability of the contractor or as the case may be of such subcontractor in respect of personal injuries and death arising out of or in the course of or caused

during the execution of the works for a minimum amount of Rs. 25 lakhs and shall produce or cause any such subcontractor to produce for inspection the relevant policy or policies together with receipt for the premium paid under such policy/policies as and when required by the Employer.

i. The Employer (NMPA) shall not be liable for any accident, damage or compensation payable to any workman or other person in the employment of the Contractor or any Subcontractor.
ii. Employer Liability Insurance: The Contractor shall indemnify and keep indemnified the Employer i.e. NMPA against all damages or compensation payable at Law in respect of or in consequence of any accident or injury to any workman or other person in the employment of the Contractor or Sub-Contractor against all claims, demands, proceedings, costs, charges and expenses whatsoever in respect thereof or in relation thereto and the Employer shall be at liberty to deduct or adjust from the Contactor's bills an amount that Employer may be called upon to pay towards claims, demands, proceedings, costs, charges and expenses Whatsoever in respect of or in relation to any accident or injury referred to above without any reference to the Contractor.
iii. The Contractor shall comply with all the Central State and Municipal Laws and Rules and shall be solely responsible for complying with the provisions of the Contract Labour (Regulations & Abolition) Act, 1970 & the contract labour (Regulation & Abolition) Karnataka Rules 1974 and rules there under and the enactments that may be applicable including ESI Act, the payment of wages act, Provident Fund Act, the Minimum Wages Act, the Factory's Act. The Workmen Compensation Act or any other applicable legislation and the Municipal by-laws or other statutory Rules and Regulations whatsoever in force if these are applicable. Any obligations finding or otherwise missed under any statutory enactments, rules & regulations there under shall be the responsibility of the Contractor and the NMPA will take no responsibility for the same. The Contractor should take Workmen's Compensation Policy for his Workers, who are not covered under ESI and submit the same to the EIC immediately after commencement of the work.
iv. The Contractor is liable to pay all Statutory Compensation to the Labourers/persons engaged by him for the satisfactory execution of the works. If any claim is made against New Mangalore Port Authority on this work, the Port Authority shall have the right to deduct the same from the bill amount payable to the contractor after verification of the validity and if admissible as per rules.
v. PERSONAL PROTECTIVE EQUIPMENTS The Contractor shall ensure the use of PPE such as helmets, safety shoes, nose masks, hand gloves, Safety Harness or any other equipment as required depending on nature of work by his staff at site.

67. War Risks Insurance

If the Contractor receives instructions from the Employer to insure against war risks, such insurance if normally available shall be effected, at the cost of the

Employer, with the Insurance Company acceptable to the Employer and shall be in the joint names of the Employer and the Contractor.

68. Royalty

Except where otherwise stated, the contractor shall pay to the authority all tonnage and other royalties, rent and other payments or compensation if any, for getting stone, sand, gravel, clay or other materials by him and his subordinates and his subcontractors and required for the works, at the rates and such conditions as notified by the State Government. The applicable rates for royalty is enclosed as Schedule-A in Volume –III. The contractor should submit the Mineral Dispatch Permit (MDP) in original for the quantity executed by the contractor for the requisite quantity of material incorporated in works for which MDP is issued by the authorized supplier. If contractor fails to submit the MDP in original the amount equal to 5 times the royalty charges shall be deducted from the contractor's bills as per prevailing orders issued by the Authority.

69. Transport of Contractor's Equipment or Temporary Works

If it is found necessary for the Contractor to move one or more loads of heavy constructional plant or equipment materials or pre-constructed units or parts of units of work over roads, highways or bridges on which such oversized and over weight items are not normally allowed to be moved, the Contractor shall obtain prior permission from the concerned authorities. Payments for complying with the requirements, if any, for protection of or strengthening of the roads, highways or bridges shall be deemed to be included in his contract price.

70. Transport of Materials or Plant

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 claim made by the concerned authorities in respect of damage or injury to roads, highways or bridges. In case of failure of the Contractor to settle such claims and in case the Employer is held responsible for payment to the authorities, then the Employer shall settle the claim and the Employer's expenses in this regard, as certified by the Engineer, may be deducted by the Employer from any money due or to become due to the Contractor and the Engineer shall notify the Contractor accordingly with a copy to the Employer.

71. Labor Laws & Regulations

The Contractor shall at all times during the continuance of the Contract comply fully with all existing Acts, regulations and bye-laws including all statutory amendments and re-enactment of State or Central Govt. and other local authorities and any other enactments and act that may be passed in future either by the State or the Central Govt. or local authority, including Indian Workmen's Compensation Act, Contract Labour (Regulation And Abolition) Act 1970 and Equal Remuneration Act 1976, Employees' State Insurance Act, 1948, Factories Act, Minimum Wages Act, Provident Fund Regulations. Employees' Provident Fund Act and schemes made under the same Act, Health and Sanitary Arrangements for Workmen, Insurance and other benefits and shall keep the Employer indemnified in case any action is commenced for contravention by the Contractor. If the Employer is caused to pay or reimburse any amounts as may be necessary to cause or observe, or for non-observance of the provisions stipulated here-forth on the part of the Contractor, the Engineer shall have the right to recover from the Contractor any sum required estimated to be required for making good the loss or damage suffered by the Employer. The Tenderers must have valid ESI and PF registration and shall maintain the records prescribed under ESI Regulations and PF Act & make the contribution towards ESI and PF in respect of persons employed by the Contractor. The contractor shall make available such records for inspection by ESI and PF authorities during inspection and furnish the copies of such records to the employer regularly. The EPF and ESI contribution on the part of the employer in respect of this contract shall be paid by the contractor. These contributions on the part of Employer paid by the contractor shall be reimbursed by the Engineer –in –charge to the contractor on actual basis. The minimum wages applicable for Mangalore City is enclosed as Schedule – B in Volume – III.

71.1. Accident Prevention / Safety Officer

The Contractor shall have on his staff on site an officer dealing with all matters regarding safety and protection against, accidents of all staff and labour. This officer shall be qualified for this work and shall have the authority to issue instructions and shall take protective measures to prevent accidents.

71.2 Disorderly Conduct

The Contractor shall at all times take all reasonable precautions to prevent any unlawful, riotous or disorderly conduct by or amongst his staff and labour and for the preservation of peace and protection of

Persons and property in the neighborhood of the Works from the same.

71.3 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 and, in collaboration with and to the requirements of the local health authorities, to ensure that medical staff, first aid equipment and stores, sick bay and suitable ambulance services are available at the camps, housing and on the site at all times throughout the period of the Contract and that suitable arrangements are made for the prevention of epidemics and for all necessary welfare and hygiene requirements.

71.4 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's Representative, an adequate supply of drinking and other water for the use of the Contractor's staff and work people.

71.5 Alcoholic Liquor or Drugs

The Contractor shall not, otherwise than in accordance with the Statues, 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, and gift, barter disposal by his sub-contractions agents or employees.

71.6 Arms and Ammunition

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

71.7 Festivals and Religious Customs

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

71.8 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 Govt., or the local medical or sanitary authorities for the purpose of dealing with and overcoming the same.

71.9 Employment of Person in the Service of Others

The Contractor shall not recruit or attempt to recruit his staff and labour from amongst persons in the service of the Employer or other agencies engaged for any works of the Employer.

71.10 Housing for Labour

Save in so far as the Contract otherwise provides, the Contractor shall

provide and maintain such accommodation and amenities as he may consider necessary for all his staff and labour employed for the purposes of or in connection with the Contract, including all fencing water supply (both for drinking and other purposes), electricity supply, sanitation, cook houses fire prevention and fire-fighting equipment, **crèche for children** of his staff and labour employed for the purposes, furniture, other requirements in connection with such accommodation or amenities. On completion of the Contract, unless otherwise agreed with the Employer, the temporary camps/housing provided by the Contractor shall be removed and the site reinstated to its original condition, all to the approval of the Engineer. The land for construction of labour camps shall be allotted outside the security area to the extent available and such area allotted for labour camps will be charged a ground rent at TAMP approved rates. The ground rent is liable for change as per the prevailing TAMP rates from time to time during the currency of the contract.

71.11 Fair Wages, Records, Inspection

The Contractor shall pay the labourers engaged by him on the work not less than a fair wage which expression shall mean whether for time or piecework the respective rates of wages as fixed by the Public Works Department as fair wages for Dakshina Kannada District payable to the different categories of labourers of those notified under the Minimum Wages Act.

The Contractor shall maintain records of Wages and other remuneration paid to his employee in such form as may be convenient and to the requirements of the Employer/Engineer and the Labour Enforcement Officer (Central), Ministry of Labour, Govt. of India, or such other authorized person appointed by the Central Govt. The Contractor shall allow inspection of the aforesaid Wage Records and Wage Slips to the Engineer and to any of his workers or to his agent at a convenient time and place after due notice is received, or to any other person authorized by him on his behalf.

71.12 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 local police authorities immediately by the available means.

71.13 Observance by Sub-Contractors

The Contractor shall be responsible for observance by his sub-contractors of the foregoing provisions.

71.14 Port Entry Permission

The Contractor shall submit prior application for Port entry passes to the concerned Port authority for his Materials, labors and the staffs engaged in the works. The Contractor has to get the vehicle and labor RIFD based passes for the entry inside the wharf area based on prevailing rates.

71.15 Site - Protected Area

The Site of Work is a protected area. Entry to the Port premises is regulated by entry passes. These passes will be issued by the Central Industrial Security Force or any other authority authorized by the Employer. The Contractor should furnish a list of person for whom the passes are to be issued to the Engineer and arrange to obtain the passes from the appropriate authority, based on the recommendation of the Engineer and abide by the Rules of the New Mangalore Port Authority with regard to entry etc. For the entry of trucks and other vehicles also, the Contractor should obtain necessary permits. The Contractor shall retain the original passes obtained by them in respect of their labour and staffs engaged in the Works and produce the same to the Engineer as and when called for. It should not be either destroyed or allowed to be taken by the labour/staff after its use.

72. Life Saving Appliances and First Aid

The Contractor shall provide and maintain upon the Works sufficient proper and efficient life saving appliances and first aid equipment to the approval of the Engineer. The appliances and equipment shall be available for use at all times.

73. Diving Operations

a) Any diving work shall be carried out in accordance with the Diving Operations Regulations of the Government of India.

b) Before any diving work is undertaken the Contractor shall supply the Engineer or his representative with two copies of the Code of signals to be employed and is to have a copy of such Code Prominently displayed on the craft or structure from which the operations take place

74. Bribes

If the Contractor, or any of his Subcontractors, agents or servants gives or offers to give to any person any bribe, gift, gratuity or commission as an inducement or reward for doing or forbearing to do any action in relation to the Contract or any other contract with the Employer, or for showing or forbearing to show favour or disfavor to any person in relation to the Contract or to any other contract with the Employer, then the

Employer may enter upon the Site and the works and terminate the employment of the Contractor and the provisions of Clause 63 hereof shall apply as if such entry and termination had been made pursuant to that Clause.

The bidders shall give an undertaking that they have not made any payment or illegal gratification to any person/authority connected with the bid process so as to influence the bid process and have not committed any offence under the PC Act in connection with the bid.

75. Details to be Confidential

The Contractor shall treat the details of the contract as private and confidential, save insofar 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 of elsewhere without the previous consent in writing of the employer. 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 Employer whose award shall be final.

76. Contractor's Temporary works, office, etc.

76.1 The Contractor shall submit to the Engineer for his approval not less than 15 days before commencement of erection of any part of Temporary Works, drawings and detailed proposals for the method of construction of Temporary works such as office, store, false work and temporary platforms etc. which he intends to construct for the execution of the contract and no such work shall be constructed before obtaining the written approval of Chief Engineer. These temporary works, office, store etc. shall be erected at or near the work area subject to approval of the Employer and the land space for the same will be allotted free of ground rent to the extent available. The Contractor shall obtain permission for any Temporary Works and would ensure that during execution of works the statutory requirements of the concerned authorities such as New Mangalore Port Authority, Police, Customs, etc. would be complied with.

76.2 Submission of Reports, Returns, etc.

76.3 All reports, statements, returns, drawings, diagrams etc. which the Contractor is required to submit to the Engineer during the progress of the Works, shall be furnished in triplicate without any additional cost.

77. Water Supply

Water to the extent available will be supplied to the Contractor at a fixed

point on the main water supply line within the Port area. The plumbing connection and extension of necessary supply pipeline to the working area shall be arranged by the Contractor at his own cost. The Contractor shall also provide a water meter at his cost for metering the quantity of water used. Charges for the consumption of the water will be paid by the Contractor to the Employer at notify rate as applicable time to time during the currency of the Contract. For non-supply of water at any stage port will not be responsible and the Contractor shall not have any claim whatever for loss or damage.

78. Power Supply

The Electricity connection for lighting, welding and other mechanical works to the extent available will be made available by the Employer within the Port area. Drawing of power lines etc. from the available point of supply of power to the actual work site either by overhead lines or underground cables shall be arranged by the contractor at his cost. The temporary lines and connections by the Contractor shall be approved by the Engineer's representative before availing power. The Contractor shall provide Trivector Meter to read consumption in units, power demand and power factor.

The Contractor shall indicate his requirement of power to the Engineer within 15 days from the date of the letter of acceptance of the tender. If the power requirement is more than 50 KW, the Contractor has to avail the power supply at 11 KV and install his own transformer of suitable capacity and work carried out as per IE Rules & Regulations as approved by the CEA. The Contractor shall pay to the Employer, the power charges as per the prevailing Tariff schedule of MESCOM in force during the work of the Contractor. At present, it is Rs.7.46 per unit consumed and demand charges @ Rs. 190.00 per KVA or part thereof per month on connected load, security deposit Rs. 4,604.00 per KVA along with departmental charges @ 23.75% of the bill amount. The Contractor shall also pay the connection and disconnection charges as applicable.

The Contractor shall ensure that the power factor of the system does not fall below 0.90 at any time and shall provide at his cost required capacity capacitors bank to maintain the Power Factor of all power loads. If the capacity of the capacitor found less than stipulated as per regulation during inspection, surcharge at Rs. 0.03 per unit will be levied. The contractor shall pay refundable Security Deposit of Rs. 4,604/- per KVA of the sanctioned load, before availing the power supply in the form of a Demand Draft drawn in favour of FA&CAO, NMPA from any Scheduled

Bank.

The Contractor shall submit a complete drawing of the power points, wiring, diagram indicating all electrical loads, earthing etc. in complete shape along with the completion report. The Trivector Meter provided is calibrated either by M/s. MESCOM or NITK, Surathkal, and such a Certificate to be produced. For non supply of power at any stage port will not be responsible and the Contractor shall not have any claim whatever for loss or damage.

79. Taxes and Duties

79.1 The Contractor shall pay Tax if any and other levies as applicable from time to time. GST at applicable rate shall be shown separate line items in the Tax invoice.

79.2 Sales / Turnover Tax on Works Contract (Deleted)

79.3 Income Tax

The Contractor and his staff shall be responsible for payment of all personal income taxes to the concerned authorities as per the law in force from time to time. Deduction of Income Tax shall be made by the Employer from each certificate of payment to the contractor at the rate of 2% plus surcharge or such other rates as may be specified by the Central Government from time to time, on the gross amount of the Contractor's bill for payment.

79.4 Goods and Service tax

The contractor shall not include GST component in rate. The GST shall be paid to the contractor separately as applicable. The contractor shall submit running account bills indicating GST separately as applicable. The Contractor shall be responsible for the payment of GST applicable, to the GST authority. The contractor shall file the applicable returns with tax department in time and submit the same as documentary evidence.

The invoice with respect to supplies should contain following information:-

- Name of the Customer : New Mangalore Port Authority
- GSTIN of the Customer : 29AAALN0057A2ZG
- All other information as specified in GST act and GST tax invoice rules such as SAC code, Supplier address, Supplier GSTIN, IRN number QR code etc.

Noncompliance of the above result in rejection of invoice.

The Invoice should be uploaded to GST website on monthly basis with in the due date as specified by GST act. Input tax credit lost by Port due to any error, omission or non filing of return will be recovered from any amount due to the supplier Any input tax credit lost by the Port due to due to any error, omission or non filing of return will be recovered from the bills and other monies available with the Port

80. Price Adjustment (not applicable to this contract)

81. Noise and Disturbance

All works shall be carried out without unreasonable noise and disturbance. The Contractor shall indemnify the Employer from and against any liability for damages on account of noise or other disturbance created while or in carrying out the work and from and against all claims demands proceedings damages costs charges and expenses whatsoever in regard or in relation to such liability.

82. Safety Code

Necessary Indian Safety regulations for the safety purpose shall be adhered to by the contractor and he will be held responsible for any violations of the same. The set of such conditions (regulation) is available with NMPA and the contractor is required to go through it before tendering.

Besides the above, the Contractor shall also scrupulously adhere to and observe the following safety codes:

The Contractor has to provide sufficient barricades to site of work so that traffic plying nearby should not damage the recently concreted work. In case of any damage on account of above, the entire responsibility will remain with contractor and nothing extra will be paid on this account.
Suitable and strong scaffolds should be provided for the workmen for all work that cannot be safely done from ground. No portable single ladder shall be over 8 meters in length.

Hoisting machines and tackles used in the works including their attachments, and supports shall be in perfect condition as per stipulations of the relevant Rules. The ropes used for hoisting or lowering materials or as means or suspension shall be of durable quality and adequate strength and free from defects.

The excavated material shall no be placed within 1.5 meters of the edge of the trench or half of the depth of the trench, whichever is more. All trenches and excavation shall be provided with necessary fencing to lighting. Every opening in the floor of a building or in a working platform shall be provided with suitable fence to prevent the fall of persons or materials. No floor, roof or other parts of the structure shall be so overloaded with debris or materials as to render it unsafe.

Workers employed on mixing and handling materials such cement, cement

mortar, concrete, lime mortar and asphalt shall be provided with protective footwear and rubber hand gloves and thin cloth for covering face and head.
Those engaged in welding work shall be provided with welder protective eye shield and glove.

All safety rules shall be strictly followed while working on live electrical systems or installations as stipulated in the relevant Rules.

83. Port Authority Rules

The Contractor shall observe the Conservancy Rules relating to the harbour and shall always take such necessary additional steps to keep the harbour waters free of noxious or unhygienic matters coming from his works as are required by the Employer. Under no circumstances shall inflammable materials be allowed to spill into the harbour waters.

The Contractor shall always observe and comply with the working rules and regulations of the Port Authority in force or as issued from time to time.

84. Execution of work

The contractor shall be required to execute the work in such a way so as not to cause any damage, hindrance or interference with port activities going on in the area or nearby. He should not also deposit the materials at such places which may cause inconvenience to the public and the work going on in the nearby area The Contractor shall have to make good all damages done by him to the structures nearby while executing the work and no extra payment shall be made to him on that account.

All the materials required to be used in the work shall have to be got approved from the Engineer-in-Charge before stacking at the site of work.
Barricading, including proper lighting arrangement in the night at the required places shall have to be provided by the contractor at his own cost, including necessary arrangements for proper movement of traffic by carefully maintained approaches and road diversions with suitable sign boards for indications of road signs etc. as directed by the Engineer-in-Charge.

85. Customs Duty

Being Port Development Project, Customs Duty shall be applicable as per project import chapter 9801.00 read with Notification 17-2001, serial No. 38 (vi) and Notification 42-96 amended by 21-2000 of customs tariff, Government of India.

Customs Duty leviable shall be paid directly by the Contractor to the Customs Authorities, Government of India. The Employer shall reimburse this amount upon submission of documentary evidence in original for the proof of payment of such Customs Duty. The reimbursement of such amount towards Customs Duty shall be limited to the Ceiling amount quoted by the Contractor in the Bill of Quantities as above. If the Contractor incurs Customs Duty Levy less than the said Ceiling Amount, the reimbursement by the Employer shall be limited to the documented cost of Customs Duty levies actually paid to the Customs Authorities, Government of India. If the Actual Customs Duty levies paid by the Contractor exceeds the said Ceiling Amount, then the reimbursement by the Employer shall be limited to the Ceiling Amount. The reimbursement of the Customs Duty will be limited only to the Imported Materials listed in “Preamble and Bill of Quantities”, BOQ No.__. During the execution of the Works, if it necessitates for expeditious completion of the Works, Contractor may resort to import of any of the materials not listed aforesaid, with the approval of the Employer. However, the aggregate amount of Customs Duty to be reimbursed shall not exceed the lump sum amount offered in the Priced Bill of Quantities.

It shall be the responsibility of the Contractor to provide the requisite particulars and documents to the customs and other Government authorities and get the Imported Materials cleared and transported in time. The Contractor shall be fully responsible for port and Customs clearance including stevedoring, handling, unloading, loading, storage, inland transportation, if any of materials, equipments and plant to storage godowns, yards, sites etc. The contractor shall be fully responsible for any delays, penalties charges and losses if any in this regard.

The Employer shall upon request from the Contractor along with necessary details, provide recommendatory letter(s) for Imported Materials at concession rate or Customs Duty as applicable. However, the responsibility for obtaining such concession rate of customs duty shall be that of the Contractor.

It shall be the responsibility of the Contractor to check the latest position on Customs duty levies applicable and the Employer does not accept any liability on the account. For bill of Lading, the “Consignee” for permanent materials to be incorporated into the Works will be the New Mangalore Port Authority. The Contractor will be “Notify Party”. Notwithstanding the above, obtaining “Essentiality Certificate” (if any), payment of deposit (if any) towards Customs Duty, etc. shall be the responsibility of the Contractor.

The Contractor shall give an undertaking follows:

a) Being the ultimate Employer of the materials to be imported and incorporated into the works covered under the Tender _____ _____ _____ we request New Mangalore Port Authority to be consignee in the matter of permanent materials to be imported by us at our cost (covering payments of materials by letter of credit) including freight, insurances, taxes and any other charges whatsoever payable in connection with the import and its incorporation into the work.

b) We hereby confirm, in the event of New Mangalore Port Authority becoming consignee, it will not absolve us from any of the obligations, and will not alter the payment terms under the Contract No. SCB II/ 2009 dated …….. between …….. (*the Contractor*) and New Mangalore Port Authority.

c) New Mangalore Port Authority becoming a consignee is a matter of convenience and we undertake to abide by all the obligations, responsibilities etc. as if we are our self a consignee.

d) In respect of nay consequences arising out of New Mangalore Port Authority becoming the consignee we hereby unequivocally and irrevocably agree to indemnify New Mangalore Port Authority for such consequences.

e) We also undertake and confirm to obtained all permits and licenses etc. at our own cost. New Mangalore Port Authority's responsibilities in this regard will be the same as under the said contract and limited to issuing required recommendatory letters for obtaining such permits and licenses.

f) *This undertaking does not in anyway vitiate our contractual liabilities and* obligations cast upon us by Contract No. SCB II/ 2009 dated …….. between ……..(*the Contractor*) and New Mangalore Port Authority.

86. Drawings & Designs

(a) General details of the works are shown on the drawings accompanying this tender document. The Engineer will supply to the Contractor from time to time during the progress of the works such further working drawings as will be necessary in his opinion for the proper and adequate execution and maintenance of the Works in accordance with the Engineer's designs and/or any modification thereof as decided by the Engineer and the Contractor shall carry out the work in accordance with the said working drawings. Two sets of such working drawings will be issued. If the Contractor requires more sets he will have to make his own

arrangement at his cost. Residual Design, Detailing & Engineering: - The Engineer to the project has done the detailed design and engineering for the subject tender. During execution of the work the residual design, detailing and engineering, if needed, is to be carried out by the contractor at no extra cost to the Employer. For equipment/ Installations detailed drawings need to be produced by the contractor at no extra cost to the Employer. The contractor shall also get approved such design, detailing & engineering from the Engineer.

(b) In the event of the Contractor proposing any alteration/modification to the Engineer's design, detail, method of construction, he shall at his own expenses prepare and submit for approval of the Engineer copies in duplicate (in the first instance) of detailed working drawings which may be required for such alteration/modification and at the same time call the attention of the Engineer to any alternative detail or modification of the contract drawings which the Contractor may wish to make at least 30 days prior to the commencement of the work or part of the work to which such drawings relate. The contractor shall at the same time, if so required by the Engineer, furnish calculation sheets in duplicate relating to the strength and anticipated deflections in respect of such altered/modified works. The Engineer will, after any such alteration which he may approve, record on the copies as amended his approval and will return one copy of the drawings and calculation sheets to the contractor, who shall carryout the work in accordance therewith. The contractor shall forward to the Engineer three additional copies of the working drawings and calculation sheets as approved in additions to these working drawings and calculation sheets as approved. In addition to these working drawings are also to be submitted (the same procedure as in the ease of the contractor) in respect of any work proposed to be executed by sub-contractors. The approval of the Engineer of all or any of the calculation sheets, drawings shall not relieve the contractor of responsibility in connection with the execution of the altered/modified or subcontractor's work.

(c) Submission of 'As built Drawings'

"As built" Drawings are required to be submitted by the Contractor and shall be supplied by them by the dates stated in the Contract Data. If the Contractor does not supply the Drawings and/or manuals by the dates stated in the Contract Data, or they do not receive the Engineer or his nominee's approval, the Engineer or his nominee shall withhold the amount stated in the Contract Data from payments due to the Contractor.

87. Monsoon Period

Monsoon period will be reckoned from 1st June to 30th September.

88. Progress Report

The following reports shall be submitted for review; as an input to the Management meeting to be held as per Clause No 31 of Conditions of Contract.

88.1 Daily reports

The contractor shall submit daily report indicating daily activities, weather condition, actual manpower, equipment and the prominent materials available and arriving to site. The contractor shall submit the daily report format to the Department for prior approval.

88.2 Monthly Reports

Monthly progress reports shall be prepared by the Contractor and submitted to the Engineer in triplicate. The first report shall cover the period up to the end of the first calendar month following the Commencement Date. Reports shall be submitted monthly thereafter, each within 7days after the last day of the period to which it relates. Reporting shall continue until the Contractor has completed all work, which is known to be outstanding at the completion date, stated in the Taking-Over Certificate for the Works.

Each report shall include:

a) Charts and detailed descriptions of progress, including each stage of design (if any), Contractor's Documents, procurement, manufacture, delivery to Site, construction, erection and testing; and including these stages for work by each Sub-Contractor,
b) Photographs in hardcopy & digital copy and videography in two sets showing the various stages of progress on the Site monthly;
c) For the supply of manufactured items, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:
    i) Commencement of manufacture,
    ii) Contractor's/Engineer's inspections,
    iii) Tests,
    iv) Shipment and arrival at the Site;
d) Copies of quality assurance documents, test results and certificates of Materials;
e) Safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and
f) Comparisons of actual and planned progress, with details of any events

or circumstances which may jeopardize the completion In accordance with the Contract, and the measures being (or to be) adopted to overcome delays.

89. Completion Documents (not applicable)

To treat that the work has been completed and issue a final payment certificate, the following documents will be deemed to form the completion documents:

i) The Technical documents according to which the work was carried out.
ii) The set of construction drawings showing therein the modifications and corrections made during the course of execution signed by the Engineer.
iii) Certificates of final levels and dimensions as set out for various works.
iv) Certificates of tests performed for various works.
v) “As Built” Drawings.

90. Submission of statutory documents

The successful bidder, with in 7days from the date of work order, shall submit self-attested copy of statutory documents such PAN card, GST registration certificate, ESI registration certificate, EPF registration certificate, Labour Identification Number (LIN) and any other documents required for successful completion of work.

G. SALIENT FEATURES OF SOME MAJOR LAWS APPLICABLE TO ESTABLISHMENTS ENGAGED IN CONSTRUCTION WORK

(a) Workmen Compensation Act 1923:- The Act provides for compensation in case of injury by accident arising out of and during the course of employment.

b) Payment of Gratuity Act 1972: Gratuity is payable to an employee under the Act on satisfaction of certain conditions on separation if an employee has completed 5 years service or more on death at the rate of 15 days wages for every completed year of service. The Act is applicable to all establishments employing 10 or more employees.

(c) Employees P.F and Miscellaneous Provision Act 1952: The Act Provides for monthly contributions by the employer and workers @ 13.00% and12% respectively. The benefits payable under the Act are:

(i) Pension to family pension on retirement or death, as the case may be.

(ii) Deposit linked insurance on the death in harness of the worker.

(iii) Payment of P.F accumulation on retirement/death etc.

d) Maternity Benefit Act 1951:-The Act provides for leave and some other benefits to workmen/ employees in case of confinement or miscarriage etc.

e) Contract Labour (Regulation & Abolition) Act 1970:-The Act provides for certain welfare measures to be provided by the Contractor to contract labour and in case the Contractor fails to provide, the same are required to be provided, by the Principal Employer by Law. The Principal Employer is required to- take Certificate of Registration and the Contractor is required to take license from the designated Officer. The Act is applicable to the establishments or Contractor of Principal Employer if they employ 20 or more contract labor.

f) Minimum Wages Act 1948: The Employer is supposed to pay not less than the Minimum Wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment Construction of Buildings, Roads, Runways are scheduled employment.

(g) Payment of Wages Act 1936:-It lays down as to by what date the wages are to be paid when it will be paid and what deductions can be made from the wages of the workers.

(h) Equal Remuneration Act 1979:-The Act provides for payment of equal wages for work of equal nature to Male and Female workers and for not

making discrimination against Female employees in the matters of transfers, training and promotions etc.

i) Payment of Bonus Act 1965: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payments of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs. 2500/- per month or above up to Rs. 3500/- per month shall be worked out by taking wages as Rs. 2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State Governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

j) Inter-State Migrant workmen's (Regulation of Employment & Conditions of Service) Act 1979:The Act is applicable to an establishment which employs 5 or more inter-state migrant workmen through an intermediary (who has recruited workmen in one state for employment in the establishment situated in another state). The Inter-State migrant workmen, in establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home upon the establishment and back,

k) The Building and Other Construction workers (Regulation of Employment and Conditions of Service) Act 1996 and the Cess Act of 1996:-All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Employer of the establishment is required to provide safety measures at the Building or Construction work and other welfare measures, such as Canteens, First-Aid facilities. Ambulance, Housing accommodations for workers near the work place etc. The Employer to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.

vi) CONTRACT DATA

Items marked “N/A” do not apply in this Contract.

Sl. No.	Description	Reference Cl. No.
1	The following documents are also part of the Contract	
	The Schedule of other contractors	(8)
	The Schedule of Key personnel	(9)
2	The above insertions should correspond to the information provided in the Invitation of Bids.	
3	The Employer is	(1)
	New Mangalore Port Authority, Panambur, Mangalore – 575010	
	Name of Authorized Representative:	
	Name : Chairman, New Mangalore Port Authority, Panambur, Mangalore – 575010	
4	The Engineer is	
	Name : Chief Engineer (C), New Mangalore Port Authority, Panambur, Mangalore- 57501010	
	Name of Nominee is	
	Name : Superintending Engineer (SE(C-II)) Civil Engineering Department, NMPA, Panambur, Mangalore- 575010	
5	The name and identification number of the Contract is	
	Name of Contract :- “Providing Galvalume sheet roofing with G.I pipes over roof slab of Fire service building Near Mallya Gate and Traffic office building at Berth No.1” Tender no: 66/2022-23	(1)
6	The works consist of ” Providing Galvalume sheet roofing with G.I pipes over roof slab of Fire service building Near	(1)

<table>
<tr><th>Sl. No.</th><th>Description</th><th>Reference Cl. No.</th></tr>
<tr><td></td><td>Mallya Gate and Traffic office building at Berth No.1”.</td><td></td></tr>
<tr><td>7</td><td>Schedule date of commencement 7 days from the date of Issue of Letter of Acceptance.

However No work shall be commenced before signing of contract Agreement.</td><td>Conditions of contract A-General 1.Definitions

59.2(a)</td></tr>
<tr><td>8</td><td>The Contract price is the price stated in the letter of acceptance. However payment will be made as per actual work done accordance with the contract provisions.</td><td>1.Definitions</td></tr>
<tr><td>9</td><td>The Intended completion Date for the whole of the Work is 9 (Nine) Months including monsoon) with the following milestones:</td><td>(17,28)</td></tr>
<tr><td>10</td><td>Milestone dates:
<table>
<tr><td>Physical works to be completed</td><td>Period from the date of commencement of work</td></tr>
<tr><td colspan="2">Milestones dates shall be provided to the Contractor by the Executive Engineer executing the work, for completion of the work as per the scheduled date.</td></tr>
</table></td><td></td></tr>
<tr><td>11</td><td>The following shall form part of the Contract Document:
(1) Form of Agreement
(2) Letter of Acceptance
(3) Contractor’s Bid
(4) Contract Data
(5) Conditions of Contract including Special Conditions of Contract
(6) Specifications
(7) Drawings
(8) Bill of quantities and
(9) Any other documents listed in the Contract Data as forming part of the Contract.
(10) Correspondence exchanged after the opening of the Bid and before the issue of Letter of Acceptance by which the Condition of Contract are amended, varied or modified in any way by mutual consent (to be enumerated).</td><td>(2.3)</td></tr>
<tr><td>12</td><td>The Contractor shall submit a Program for the Works within 14 days of delivery of the letter of Acceptance.</td><td>(27)</td></tr>
</table>

Sl. No.	Description	Reference Cl. No.
13	The site possession date The site will be handed over immediately after issue of Letter of acceptance and the site is free from encumbrances.	(21)
14	The site is defined in drawing No. 22/92/Mtc-II/2022-Ts-LP	
15	The Defects Liability Period is 1 (One) year	(35) 13
16	The minimum insurance cover for physical property, injury and death is Rs.5,00,000/- (Rupees five Lakhs) per occurrence with the number of occurrences limited to four. After each occurrence, contractor will pay additional premium necessary to make insurance valid for four occurrences always.	
17	The following events shall also be Compensation Events: The Employer terminates the contract for his convenience.	(44)
18	The period between Programme updates shall be 30 days.	(27)
19	The amount to be withheld for late submission of an updated Programme shall be Rs. 25,000/-.	(27)
20	The Penalty for the delay in submission of the Performance guarantee shall be at the rate of 0.25% of the amount of performance guarantee for each week or part of the week for the number of weeks delayed beyond the stipulated date of submission.	(52.2) 34.1
21	The language of the Contract documents is English.	(3)
22	The law, which applies to the Contract, is the law of Union of India.	(3)
23	The currency of the Contract is Indian Rupees.	(46)
24	Fees and types of reimbursable expenses to be paid to the Dispute Review Board (Deleted) As per actuals and equally shared by both the parties. (NA)	(25)
25	The Dispute Review Board shall be constituted after signing of the agreement on mutually agreed terms. (Appendix 1). (Deleted) (NA)	(25)
26	Price Adjustment (deleted)	(47) (80)
27	The proportion of payments retained (retention money) shall be 10% of total tax invoice value from each bill subject to a maximum of 5% of the contract price	(48)

Sl. No.	Description	Reference Cl. No.
	including GST as applicable.	
28	The maximum amount of liquidated damages for the whole of the works is 10 % of the contract price plus taxes and duties. The half per cent (½%) per week L.D is applicable for delay period of $\frac{1}{3}$of contract period and thereafter 10% L.D is applicable.	[49]
29	Clause No. 49A (v) deleted.	
30	Advance payment is not applicable to this contract	[51]
31	Repayment of secured advance: deleted	(51.6)
32	The Securities shall be for the following minimum amounts equivalent as a percentage of the Contract Price.	(52)
33	Performance Security in the form of Bank guarantee for 3% of the contract price including GST.	(52.2)
34	The standard form of Performance Security acceptable to the Employer shall be an unconditional Bank Guarantee of the type as presented in Section III (iv) of the Bidding Documents.	Annexure-A

vii) FORM OF SECURITIES

Acceptable forms of securities are annexed. Bidders should not complete the Performance Security form at this time. Only the successful Bidder will be required to provide Performance and Advance Payment Securities in accordance with one of the forms, or in a similar form acceptable to the Employer.

Annexure A: Performance Bank Guarantee

Annexure B: Bank Guarantee for Advance Payment

Annexure A

PERFORMANCE BANK GUARANTEE

To: _____ [name of Employer]
_____ [address of Employer]
WHEREAS_____ [name and address of Contractor] (hereinafter called “the Contractor”) has undertaken, in pursuance of Contract _____ No._____ dated_____ to execute _____ _____ [name of Contract and brief description of Works] (hereinafter called “the Contract”).

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall furnish you with a Bank Guarantee by a recognized bank for the sum specified therein as security for compliance with his obligations in accordance with the Contract;

AND WHEREAS we have agreed to give the Contractor such a Bank Guarantee;

NOW THEREFORE we hereby affirm that we are the Guarantor and responsible to you, on behalf of the Contractor, up to a total of _____ [amount of guarantee]1 _____ [In words], such sum being payable in the types and proportions of currencies in which the Contract Price is payable, and we undertake to pay you, upon your first written demand, and without cavil or argument, any sum or sums within the limits of _____ [amount of guarantee]1 as aforesaid without your needing to prove or to show grounds or reasons for your demand for the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Contractor before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the Contract or of the Works to be performed there under or of any of the Contract documents which may be made between you and the Contractor shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

This guarantee shall be valid until 28 days from the date of expiry of the Defects Liability Period.

Notwithstanding anything mentioned above,

Our liability against this guarantee is restricted to Rs..... (Rupees ..... only) and unless a claim in writing is lodged with us within 3 months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharges.

IN WITNESS WHEREOF this guarantee has been duly executed on this …….. day of ……..

Signature and seal of the guarantor _____
Name of Bank _____
Address_____Date_____
_____

1 An amount shall be inserted by the Guarantor, representing the percentage of the Contract Price specified in the Contract and denominated in Indian Rupees.

Annexure B (NA)

BANK GUARANTEE FOR ADVANCE PAYMENT (NOT APPLICABLE)

To: _____ [name of Employer]

_____ [address of Employer]

_____ [name of Contract]

Gentlemen:

In accordance with the provisions of the Conditions of Contract, Sub-clause 51.1 ("Advance Payment") of the above mentioned Contract, _____[name and address of Contractor] (hereinafter called "the Contractor") shall deposit with_____[name of Employer] a bank guarantee to guarantee his proper and faithful performance under the said Clause of the Contract in an amount of

1

_____[amount of guarantee] _____[in words].

We, the_____ [bank or financial institution], as instructed by the Contractor, agree unconditionally and irrevocably to guarantee as primary obligator and not as Surety merely, the payment to_____[name of Employer] on his first demand without whatsoever right of objection on our part and without his first claim to the Contractor, in the amount not exceeding _____[amount of guarantee]1 _____[in words].

We further agree that no change or addition to or other modification of the terms of the Contract or of Works to be performed there under or of any of the Contract documents which may be made between_____[name of Employer] and the Contractor, shall in any way release us from any liability under this guarantee, and we hereby waive notice of any such change, addition or modification.

The guarantee shall remain valid and in full effect from the date of the advance payment under the Contract until_____[name of Employer] receives full repayment of the same amount from the Contractor.

Notwithstanding anything mentioned above,

Our liability against this guarantee is restricted to Rs……(Rupees ……only) and unless a claim in writing is lodged with us within 3 months of the date of expiry or the extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharges.

IN WITNESS WHEREOF this guarantee has been duly executed on this ……day of ……

Yours truly,

Signature and seal:_____

Name of Bank / Financial Institution:_____

Address:_____

Date:_____ 1. An amount shall be inserted by the bank or financial institution representing the amount of the Advance Payment, and denominated in Indian Rupees.

Annexure – C (NA)

BANK GUARANTEE FOR RETENTION MONEY (NOT APPLICABLE)

To

New Mangalore Port Authority,
Administrative Building,
Panambur, Mangalore – 575 010.

1. In consideration of the Board Members of the New Mangalore Port Authority, Mangalore (hereinafter called "The Board" having agreed to refund _____ _____ (hereinafter called "the said contractor(s)") under the terms and conditions of an Agreement No._____ made between New Mangalore Port Authority and _____ (hereinafter called "the said Agreement") the retention money for the due fulfillment by the said contractor(s) of the terms and conditions contained in the said agreement on production of a bank guarantee for _____. We _____ (hereinafter referred to as "the Bank") at the request of M/s._____ do hereby undertake to pay the Board an amount not exceeding _____ on demand.

2. We _____ do hereby undertake to pay the amounts due and payable under this guarantee without any demur, merely on a demand from the Board stating that the amount claimed is required to meet the recoveries due or likely to be due from the said Contractor(s). Any such demand made on the bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs._____
3. We _____ undertake to pay the Board any money so demanded notwithstanding any dispute or disputes raised by the Contractor(s) in any suit or proceeding pending before any Court or Tribunal relating there to, our liability under this present being absolute and unequivocal.

   The payment so made by us under this bond shall be a valid discharge of our liability for payment there under and the Contractor(s) shall have no claim against us for making such payment.
4. We _____ further agree that the guarantee herein

contained shall remain in full force and effect during the period that would be taken for the performance of the said Agreement and that it shall continue to be enforceable till all the dues of the Board under or by virtue of the said Agreement have been fully paid and its claims satisfied or discharged or till Engineer-in-charge on behalf of the Board certifies that the terms and conditions of the said Agreement have been fully and properly carried out by the said Contractor(s) and accordingly discharges this guarantee.

5. We _____ further agree with the Board that Board shall have the fullest liberty without our consent and without affecting in any manner our obligations here under to vary any of the terms and conditions of the said agreement or to extend time of performance by the said Contractor(s) from time to time or to postpone for any time or from time to time any of the powers exercisable by the Board against the said Contractor(s) and to forbear or enforce any of the terms and conditions relating to the said Agreement and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Contractor(s) or for any forbearance act or omission on the part of the Board or any indulgence by the Board to the said Contractor(s) or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision, have effect so relieving us.

6. This guarantee will not be discharged due to the change in the constitution of the Bank or the Contractor(s).

7. We _____ lastly undertake not to revoke this guarantee except with the previous consent of the Board in writing.

8. This guarantee shall be valid up to _____ unless extended on demand by Board Notwithstanding anything mentioned above, our liability against this guarantee is restricted to Rs._____ and unless a claim in writing is lodged with us within three months of the date of expiry or such extended date of expiry of this guarantee all our liabilities under this guarantee shall stand discharged.

Notwithstanding anything contained herein.

1. Our liability under this Bank Guarantee restricted to a sum of Rs._____

_____Only).

2. This bank guarantee shall be valid up to _____We are liable to pay the guaranteed amount or any part thereof under this bank guarantee only and only if you serve upon us a written claim or demand on or before _____.

iv. APPENDIX 1 GENERAL CONDITIONS OF CONTRACT (NA)

DISPUTES REVIEW BOARD AGREEMENT (NOT APPLICABLE)

THIS AGREEMENT, made and entered into this ..... Day of.....20..... Between ..... ("the Employer") and..... ..... ("the Contractor"),and the Disputes Review Board ("the Board") consisting of One / three Board Members, (1) ..... (2) ..... (3) .....

[Note : Delete whatever is not applicable]

WITNESSETH, that

WHEREAS, the Employer and the Contractor have contracted for the construction of the .... (Project name) ..... (the "Contract") and

WHEREAS, the contract provides for the establishment and operation of the Board NOW THEREFORE, the parties hereto agree as follows :

1. The parties agree to the establishment and operation of the Board in accordance with this Board Agreement.
2. Except for providing the services required hereunder, the Board Members should not give any advice to either party or to the Engineer or his nominee concerning conduct of the Works.

   The Board Members :

   a. shall have no financial interest in any party to the contract or the Engineer or his nominee, or a financial interest in the contract, except for payment for services on the Board.
   b. shall have had no previous employment by, or financial ties to, any party to the contract, or the Engineer or his nominee, except for fee based consulting services on other projects, all of which must be disclosed prior to appointment to the Board.
   c. shall have disclosed in writing to the parties prior to signature of this Agreement any and all recent or close professional or personal or personal relationships with any director, officer, or employee of any party to the contract, or the Engineer or his nominee, and any and all prior involvement in the project to which the contract relates;

d. shall not, while a Board Member, be employed whether as a consultant or otherwise by either party to the contract, or the Engineer or his nominee, except as a Board Member.
e. shall not, while a Board Member, engage in discussion or make any agreement with any party to the contract, or with the Engineer or his nominee, regarding employment whether as a consultant or otherwise either after the contract is completed or after services as a Board Member is completed;
f. shall be and remain impartial and independent of the parties and shall disclose in writing to the Employer, the Contractor, the Engineer or his nominee, and one another any fact or circumstances which might be such to cause either the Employer or the Contractor to question the continued existence of the impartiality and independence required of Board Members.

3. Except for its participation in the Board's activities as provided in the contract and in this Agreement none of the Employer, the Contractor, the Engineer or his nominee, and one another any fact or circumstances which might be such to cause either the Employer or the Contractor to question the continued existence of the impartiality and independence required of Board Members.

4. The Contractor shall :
   a) furnish to each Board Members one copy of all documents which the Board may request including contract documents, progress reports, variation orders, and other documents, pertinent to the performance of the Contract.
   b) in co-operation with the Employer, co-ordinate the Site visits of the Board, including conference facilities, and secretarial and copying services.
5. The Board shall serve throughout the operation of the contract. It shall begin operation following execution of this Agreement, and shall terminate its activities after issuance of the taking over Certificate and the Board's issuance of its Recommendations on all disputes referred to it.
6. Board Member shall not assign or subcontract any of their work under this Agreement.
7. The Board Members are independent and not employees or agents of either the Employer or the Contractor.
8. The Board Members are absolved of any personal or professional liability arising from the activities and the Recommendations of the Board.
9. Fees and expenses of the Board Member[s] shall be agreed to and shared equally by the Employer and the Contractor. If the Board requires special

services, such as accounting, data research, and the like, both parties must agree and the costs shall be shared by them as mutually agreed.

10. Board Site visits :
    a. The Board shall visit the Site and meet with representatives of the Employer and the Contractor and the Engineer or his nominee at regular intervals, at times of critical construction events, and at the written request of either party. The timing of Site failing agreement shall be fixed by the Board.
    b. Site meetings shall consist of an informal discussion of the status of the construction of the works followed by an inspection of the works, both attended by personnel from the Employer, the Contractor and the Engineer or his nominee.
    c. If requested by either party or the Board, the Employer will prepare minutes of the meetings and circulate them for comments of the parties and the Engineer or his nominee.
11. Procedure for disputes referred to the Board:
    a. If either party objects to any action or inaction of the other party or the Engineer or his nominee, the objecting party may file a written Notice of Dispute to the other party with a copy to the Engineer or his nominee stating that it is given pursuant to Clause 65 and stating clearly and in detail the basis of the dispute.
    b. The party receiving the Notice of Dispute will consider it and respond in writing within 7 days after receipt.
    c. This response shall be final and conclusive on the subject, unless a written appeal to the response is filed with the responding party within 7 days of receiving the response. Both parties are encouraged to pursue the matter further to attempt to settle the dispute. When it appears that the dispute cannot be resolved without the assistance of the Board either party may refer the dispute to the Board by written Request for Recommendation to the Board, the other party and the Engineer or his nominee stating that it is made pursuant to Clause 65.
    d. The Request for recommendation shall state clearly and in full detail the specific issues of the dispute to be considered by the Board.
    e. When a dispute is referred to the Board, and the Board is satisfied that the dispute requires the Board's assistance, the Board shall decide when to conduct a hearing on the dispute. The Board may request that written documentation and arguments from both parties be submitted to each Board Members before the hearing begins. The parties shall submit insofar as possible agreed statements of the

relevant facts.

f. During the hearing, the Contractor, the Employer, and the Engineer or his nominee shall each have ample opportunity to be heard and to offer evidence. The Board's Recommendations for resolution of the dispute will be given in writing, to the Employer, the Contractor and the Engineer or his nominee as soon as possible, and in any event not more than 28 days after the Board's final hearing on the dispute.

12. Conduct of Hearings :

a. Normally hearing will be conducted at the Site, but any location that would be more convenient and still provide all required facilities and access to necessary documentation may be utilized by the Board. Private sessions of the Board may be held at any location convenient to the Board.

b. The Employer, the Engineer or his nominee and the Contractor shall have representatives at all hearings.

c. During the hearings, no Board Member shall express any opinion concerning the merit of any facet of the case.

d. After the hearing are concluded, the Board shall meet privately to formulate its Recommendations. All Board deliberations shall be conducted in private, with all individual views kept strictly confidential. The Board's Recommendations, together with an explanation of its reasoning shall be submitted in writing to both parties and to the Engineer or his nominee. The Recommendations shall be based on the pertinent contract provisions, applicable laws and regulations, and the facts and circumstances involved in the dispute.

e. The Board shall make every effort to reach a unanimous Recommendation. If this proves impossible, the majority shall decide, and the dissenting member any prepare a written minority report for submission to both parties.

[Note: Delete if it is one member Board]

13. If during the contract period, the Employer and the Contractor are of the opinion that the Dispute Review Board is not performing its functions properly; the Employer and the Contractor may together disband the Disputes Review Board. In such an event, the disputes shall referred to Arbitration straightaway.

The Employer and the Contractor shall jointly sign a notice specifying that the Board shall stand disbanded with effect from the date specified in the notice. The notice shall be posted by a registered letter with AD or delivery of the letter, even if he refuses to do so.

NEW MANGALORE PORT AUTHORITY
Panambur, Mangalore

"Providing Galvolume sheet roofing with G.I pipes over roof slab of Fire service building Near Mallya Gate and Traffic office building at Berth No.1"

TENDER DOCUMENT
Volume - II

NEW MANGALORE PORT AUTHORITY

CIVIL ENGINEERING DEPARTMENT

Tender no: 66/2022-23

Tender for

"Providing Galvolume sheet roofing with G.I pipes over roof slab of Fire service building Near Mallya Gate and Traffic office building at Berth No.1"

Volume I	Section I	i)	Notice Inviting Tenders
		i)	Instructions to Tenderers
		ii)	Annexure (1 to 13)
	Section II	i)	Form of Agreement
	Section III	i)	Conditions of Contract: Part A - E: General Conditions
		ii)	Conditions of Contract : Part F: Special Conditions
		iii)	Contract Data
		iv)	Form of Securities (A & B)
		v)	Appendix – I and Appendix - II
Volume II	Section IV	i)	Technical Specifications
	Section V	ii)	Drawings
Volume III	Section VI	i)	Preamble
		ii)	Bill of Quantities
		iii)	For of tender
	Section VII	i)	Schedules (A & B)

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SECTION IV

TECHNICAL SPECIFICATIONS

A. GENERAL

1. INTRODUCTION

The intent of this technical specification covers construction of all civil works as covered in the scope of contract as per drawings supplied by Owner.

All civil works shall be carried out as per design / drawings standardized by the Consultant / Owner and the specification provided by the Consultant / Owner. All standard drawings are enclosed with the tender documents. In case any item is not covered under specification then the same shall be carried out as per CPWD specification and applicable Standards and Codes. Any item for which specification is not provided herein and is not covered under CPWD specification shall be executed as per manufacturer guidelines. All materials shall be of best quality conforming to relevant Standards and Codes. In case of any conflict between Standards / Code and Technical Specification, the provisions of Technical Specification shall prevail, and the Engineer's decision on interpretation shall be final.

The Contractor shall furnish all labor, tools, equipment, materials, temporary works, constructional plant and machinery, fuel supply, transportation and all other incidental items not shown or specified but as may be required for complete performance of the Works in accordance with drawings, specifications and direction of Owner.

Excavated earth is to be disposed from site as instructed, only into approved landfill areas and dump yard. The cost of excavation to include for necessary lead and lift as specified.

All materials including cement, reinforcement steel and structural steel etc. shall be arranged by the Contractor. All testing required shall be arranged by the Contractor at his own cost. The contractor shall execute the work as per the standard Field Quality Plan (FQP) of NMPA.

The bidder shall fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon patterns, local conditions and site specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may not have been specifically brought out in the specifications.

Level and date of concreting shall be marked on the building from outside at every floor level with proper paint, etc.

All levels and survey work shall be measured by total station and electronic level machine at all floors and places.

Brief Description of Works

The scope of work is defined in the Notice Inviting Tender. The Contractor shall provide all necessary materials, equipment and labour etc. for the execution and maintenance of the work till completion.

The work shall be executed in accordance with the specification stipulated in the Bill of Quantity and other bidding documents read along with CPWD (Central Public Works Department) specifications for civil works and IS codes with up-to-date revisions. For non-schedule items specification as given along with tender document and similar items of CPWD shall be applicable.

The list of references for civil works are CPWD specifications, relevant IS codes and best practices.

For deep excavations, necessary shoring is to be done, the design of which will be provided by the contractor, after assessing site and soil conditions, and work only to be commenced on site after the same is duly approved by NMPA. Any approval if required from the Mineral department or any other statutory body that has jurisdiction on such excavations has to be obtained by the contractor.

All earth used for back filling should be of approved quality.

Portland Cement of IS 8112 shall be used for all cement & concrete works. This will supersede other specifications of cement to be used for the works.

For ready mixed cement concrete, in addition to the CPWD specification, the following also to be noted:

The cost towards cement quantity reduced from the specified quantity in the item due to mixing of fly ash shall be deducted as per relevant BOQ item. The design mix shall be submitted to Engineer in Charge for approval.

All hard ware fittings shall be of best quality and shall be selected as per the Instructions of Engineer in Charge.

Site location, Boundaries and Possession

The location and boundaries of the Site are shown on the Drawing. The Contractor shall confine his activities strictly to the allotted site area(s) and shall not allow his personnel to trespass upon any other areas occupied by the Employer.

1.4 Site Datum and Base Lines

A base line shall be established within the working area by the Contractor. The base line shall be referenced to the site co-ordinate system (based on the Local Coordinates of New Mangalore Port). This bench mark and base line will be the basis for the setting-out for all the Works. The main levels and lines for each portion of the Works shall be established from the bench mark and base line by the Contractor.

1.5 Site Conditions

1.5.1 Location of Work

As per enclosed location plan.

1.5.2 Climate

The climate at Mangalore is tropical with high humidity and a maximum shade temperature of 36°C. The average annual rainfall is approximately 3330 mm and concentrated in the south-west monsoon months of June, July, August and September during which period the average rainfall is as much as 82% of the total annual rainfall.

1.5.3 Wind

The wind in the monsoon months of June, July and August are predominantly from south-west and west with a maximum intensity of 5 on the Beaufort Scale. The winds in the remaining months of the year are predominantly from the north-west and the maximum intensity during this period is also of 5 on the Beaufort Scale.

1.5.4 Cyclones

Even though Mangalore is within the cyclonic area of storms originating in the Arabian Sea and those that enter across the Indian Peninsula from Bay of Bengal, cyclones are not as severe or frequent as in the Bay of Bengal. The maximum wind speed so far recorded in cyclonic storm, generally does not exceed 62 kmph (16.9 m/sec.) except one during 1965 when the maximum speed recorded was 97 kmph (26.9 m/sec.)

1.5.5 Visibility

Thirty year period observations conducted by the Indian Meteorological Department reveal that poor visibility (visibility less than 4 Kms) is encountered for about 10 days in the south-west monsoon period. The maximum number of foggy days in a year is only 3.

1.5.6 Site Preparation

The Contractor shall furnish all necessary supervision, labour, materials, equipment and tools for Site Preparation, clearing and all other works. Clearing shall mean to completely demolish, remove and dispose with all leads, lifts and descents from the area marked, trees, bushes, deadfalls, embedded logs, dislodged roots, stumps, snogs, boulders, mounds, existing structures and other objectionable materials. The areas required to be cleared shall consist of the work Site, ditches, borrow pits, diversions and all other areas necessary for the construction work as directed by the Engineer-in-Charge.

Before any Temporary Works are commenced, the Contractor shall submit his proposal along with complete drawings of all Temporary Work, he may require for the execution of the Works in advance to the Engineer for approval. The Contractor shall also submit his calculations relating to the design of temporary works, strength, etc. if required by the Engineer and shall carry out the modifications

that the Engineer may require of such temporary works at Contractor's own cost. The Contractor shall be solely responsible for the stability and safety of all Temporary Work.

It will be the responsibility of the Contractor to make timely procurement of all materials and mobilize all essential equipment for both Temporary and Permanent Works.

1.6 Site Information

The detailed drawing of the construction site for adaptation of methodology for the construction. However, on account of this change in the geographical profile of site, no extra cost for additional arrangement required to be made will be paid for.

1.7 The Nature of Soil Profile

The site comprises of ordinary soil. The details furnished herein are only for the information / guidelines of the tenderers and the successful contractor shall not claim for any deviation in the actual subsoil profile encountered at site.

1.8 Records

Complete records of all operations connected with the work shall be kept by the Contractor. The Contractor shall submit to the Engineer-in-charge for approval his proposal of the manner of presentation of these records. Three copies of all such records shall be furnished to the Engineer-in-charge on completion of each test or operation.

B. Works.

Precautions during Dismantling Work

For general guidelines, reference may be made to Section 100 of these Specifications. Dismantling work shall not be carried out at night, or during storm or heavy rain. A warning device shall be installed in the area for warning the workers in case of mishap/emergency. Safety helmets conforming to IS:2925 shall be used by the workmen engaged in dismantling work. The sheds and tool boxes should he located away from the work site. To protect eyes and face from injuries from flying pieces, dirt, dust etc., celluloid goggles and gas masks shall i)e worn at the time of dismantling, especially where tools like jack hammers are deployed. Leather or rubber gloves shall be worn by the workers during the demolition of RCC work. Screens made of GI sheets shall be placed wherever necessary to prevent flying pieces from injuring the workers. Water should be sprayed to reduce the dust while removing concrete wearing course with jack hammer. No work shall be taken up under the span when dismantling work is in progress.

1. Dismantling of A.C. sheets

Dismantling A.C. sheet roofing and stacking the material within a radius of 150 meters. Including cost of materials, labour, HOM complete as per specifications.

2. Demolishing Brick Work

Demolishing brick work manually/ by mechanical means including stacking of serviceable material and disposal of unserviceable material to the appropriate disposal area as per direction of Engineer-in-charge.

3. Demolishing Cement Concrete

Demolishing cement concrete manually/ by mechanical means including disposal of material to the appropriate disposal area as per direction of Engineer-in-charge.

4. Earth Work Excavation

Earth work excavation by manual means for drains, canals, waste weir, draft, approach channels, key trenches, foundation of bridges and such similar works in all kinds of soils , as per drawing and technical specifications, including setting out, shoring, strutting, barricading, caution lights, removal of stumps and other deleterious matter, excavated surface leveled and sides neatly dressed disposing off the excavated stuff or sorting & stacking the selected stuff for reuse in a radius of 50 m and lift up to 1.5 m including cost of labour, tools & other appurtenances required to complete the work.

2.0 EARTH WORK

2.0 DEFINITIONS

Deadmen or Tell Tales: Mounds of earth left undisturbed in pits dug out for borrowing earth

Burjis: Short pillars of brick/ stone having top surface finished with cement plaster for marking etc.

Formation or Profile: Final shape of the ground after excavation or filling up.

Foul condition: Filthy and unhygienic conditions where physical movements are hampered such

as soil mixed with sewage or night soil.

Lead : All distances shall be measured over the shortest practical route and not necessarily the route actually taken. Route other than shortest practical route may be considered in cases of unavoidable circumstances and approved by Engineer-in-charge along with reasons in writing.

Carriage by manual labour shall be reckoned in units of 50 m or part thereof.

Carriage by animal and mechanical transport shall be reckoned in one km. unit. Distances of 0.5 km. or more shall be taken as 1 km. and distance of less than 0.5 km. shall be ignored. However, when the total lead is less than 0.5 km., it will not be ignored but paid for separately in successive stages of 50 m subject to the condition that the rate worked on this basis does not exceed the rate for initial lead of 1 km. by mechanical / animal transport.

Lift: The vertical distance for removal with reference to the ground level. The excavation up to 1.5 m depth below the ground level and depositing the excavated materials up to 1.5 m above the ground level are included in the rate of earth work. Lifts inherent in the lead due to ground slope shall not be paid for.

Safety rules: Safety rules as laid down by the statutory authority and as provided in National Building Code (NBC) shall be followed.

2.1 CLASSIFICATION OF SOILS 2.1.0

The earthwork shall be classified under the following categories and measured separately for each category:

All kind of soils: Generally any strata, such as sand, gravel, loam, clay, mud, black cotton moorum, shingle, river or nallah bed boulders, siding of roads, paths etc. and hard core, macadam surface of any description (water bound, grouted tarmac etc.), lime concrete mud concrete and their mixtures which for excavation yields to application of picks, showers, jumper, sacrifices, ripper and other manual digging implements.

Ordinary rock: Generally any rock which can be excavated by splitting with crow bars or picks and does not require blasting, wedging or similar means for excavation such as lime stone, sand stone, hard laterite, hard conglomerate and un-reinforced cement concrete below ground level.

If required light blasting may be resorted to for loosening the materials but this will not in any way entitle the material to be classified as ‘Hard rock’

hard rock: Generally any rock or boulder for the excavation of which blasting is required such as quartzite, granite, basalt, reinforced cement concrete (reinforcement to be cut through but not separated from concrete) below ground level and the like. (d) Hard rock (blasting prohibited): Hard rock requiring blasting as described under (c) but where the blasting is prohibited for any reason and excavation has to be carried out by chiseling, wedging, use of rock hammers and cutters or any other agreed method.

5. Providing and laying in position plain cement concrete

Providing and laying in position plain cement concrete for levelling course for all works in foundation. The granite / trap / basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed, laid in layers not exceeding 150 mm thickness, well compacted using plate vibrators, including all lead & lifts, cost of all materials of quality, labour, Usage charges of machineries, curing, and all the other appurtenances required to complete the work as per technical specifications. (The cost of steel reinforcement & formwork shall be paid separately.

6. Reinforced cement concrete

Providing and laying in position Reinforced cement concrete for all Sub structures of building, Irrigation works, Sub-structure works of bridges, Drain works & other parallel works from 0.50m to 3.50 m height. The granite / trap / basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed with super plasticizers, laid in layers, well compacted using needle vibrators, providing weep holes wherever necessary, including all lead & lifts, cost of all materials of quality, confirming to the requirements of relevant IS codes, labour, Usage charges of machinery, curing and all of other appurtenances required to complete the work as per technical specifications. (The cost of steel reinforcement & formwork to be paid separately. Mix 1:2:4 (M15) Using 20 mm nominal size graded crushed coarse aggregates

5.0 REINFORCED CEMENT CONCRETE WORK

GENERAL Reinforced cement concrete work may be cast-in-situ or Precast as may be directed by Engineer-in-Charge according to the nature of work. Reinforced cement concrete work shall comprise of the following which may be paid separately or collectively as per the description of the item of work.

(a) Form work (Centering and Shuttering)

(b) Reinforcement

(c) Concreting: (1– Cast-in-situ), (2 – Precast)

5.1 MATERIALS 5.1.1 Water, cement, fine and coarse aggregate shall be as specified under respective clauses of chapter 03 mortars and chapter 04 concrete work as applicable.

5.1.2 Fly Ash admixed cement concrete (FACC) and fly ash Blended cements in Cement Concrete (PPCC) in RCC structures.

5.1.2.0 Fly ash Blended Cements conforming to IS 1489 (Part I) may be used in RCC structures as per guidelines given below:

5.1.2.1 General (i) IS 456- 2000 Code of Practice for Plain and Reinforced Concrete (as amended up to date) shall be followed in regard to Concrete Mix Proportion and its production as under: (a) The concrete mix design shall be done as “Design Mix Concrete” as prescribed in clause-9 of IS 456 mentioned above. (b) Concrete shall be manufactured in accordance with clause 10 of above mentioned IS 456 covering quality assurance measures both technical and organizational, which shall also necessarily require a qualified Concrete Technologist to be available during

manufacture of concrete for certification of quality of concrete.

(ii) Minimum M -25 grade of concrete shall be used in all structural elements made with RCC both in load bearing and framed structure.

(iii) The mechanical properties such as modulus of elasticity, tensile strength, creep and shrinkage of fly ash mixed concrete or concrete using fly ash blended cements (PPCs) are not likely to be significantly different and their values are to be taken same as those used for concrete made with OPC.

(iv) To control higher rate of carbonation in early ages of concrete both in fly ash admixed as well as PPC based concrete, water/binder ratio shall be kept as low as possible, which shall be closely monitored during concrete manufacture. If necessitated due to low water/binder ratio, required workability shall be achieved by use of chloride free chemical admixtures conforming to IS 9103. The compatibility of chemical admixtures and super plasticizers with each set OPC, fly ash and /or PPC received from different sources shall be ensured by trials.

In environment subjected to aggressive chloride or sulphate attach in particular, use of fly ash admixed or PPC based concrete is recommended. In cases, where structural concrete is exposed to excessive magnesium sulphate, fly ash substitution/content shall be limited to 18% by weight. Special type of cement with low C3A content may also be alternatively used. Durability criteria like minimum binder content and maximum water /binder ratio also need to be given due consideration in such environment.

(vi) Wet curing period shall be enhanced to a minimum of 10 days or its equivalent. In hot & arid regions, the minimum curing period shall be 14 days or its equivalent.

5.1.2.2 Use of Fly ash Admixed cement Concrete (FACC) in RCC structures

There shall be no bar on use of in RCC structures subject to following additional conditions:-

i. Fly ash shall have its chemicals characteristics and physical requirements etc. confirming to IS 3812(part I & II) and shall be duly certified.
ii. Should ensure uniform blending of fly ash with cement in conformity with IS 456, a specific facility needs to be created at site with complete computerized automated process control to achieve design quality or with similar facility from RMC plants.
iii. As per IS 1489 (Part-I) minimum 35% of OPC by mass is permitted to be subtitled with fly ash conforming to IS 3812 (Part-I) and same is reiterated.

5.1.2.3 Use of Fly Ash Blended cements in cement concrete (PPCC) in RCC structures

Subject to General Guidelines detailed out as above, PPC manufactured confirming to IS 1489 (part-I) shall be treated at par with OPC may mass is permitted to be

5.1.3 Steel for Reinforcement

7. Scraping plaster in lime or cement mortar from brick stone masonry.
8. Dismantling

Dismantling aluminum/ Gypsum partitions, doors, windows, fixed glazing and false ceiling

including disposal of unserviceable material and stacking of serviceable material to the appropriate disposal area as per direction of Engineer-in-charge.

ReinforcedCementConcrete:

Specifications of steel reinforcement for R.C.C. work ready to use "Cut and bend rebars, Reinforcement couplers, Precast door & window frames, Expansion joint covering with cement bonded particle board, Expansion joint covering with stainless steel grade 304, RCC for construction of piers, abutment, portal frame, pier caps, bearing pedestals & seismic arresters, RCC diaphragm wall and Expansion joint system for floor, wall & roof joint have been incorporated. Guidelines for multistage centering also introduced in this sub head. Providing and laying in position Reinforced cement concrete for all Sub structures of building, Irrigation works, Sub structure works of bridges, Drain works & other parallel works from 0.50m to 3.50 m height. The granite / trap / basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed with super plasticizers, laid in layers, well compacted using needle vibrators, providing weep holes wherever necessary, including all lead & lifts, cost of all materials of quality, confirming to the requirements of relevant IS codes, labour, Usage charges of machinery, curing and all other appurtenances required to complete the work as per technical specifications. (The cost of steel reinforcement & formwork to be paid separately).

9. 5.0 REINFORCED CEMENT CONCRETE WORK

5.0 GENERAL

Reinforced cement concrete work may be cast-in-situ or Precast as may be directed by Engineer-in Charge according to the nature of work. Reinforced cement concrete work shall comprise of the following which may be paid separately or collectively as per the description of the item of work.

(a) Form work (Centering and Shuttering) (b) Reinforcement (c) Concreting: (1– Cast-in-situ), (2 – Precast) 5.1 MATERIALS 5.1.1 Water, cement, fine and coarse aggregate shall be as specified under respective clauses of chapter 03 mortars and chapter 04 concrete work as applicable.

5.1.2 Fly Ash admixed cement concrete (FACC) and fly ash Blended cements in Cement Concrete (PPCC) in RCC structures.

5.1.2.0 Fly ash Blended Cements conforming to IS 1489 (Part I) may be used in RCC structures as per guidelines given below:

5.1.2.1 General (i) IS 456- 2000 Code of Practice for Plain and Reinforced Concrete (as amended up to date) shall be followed in regard to Concrete Mix Proportion and its production as under:

(a) The concrete mix design shall be done as "Design Mix Concrete" as prescribed in clause-9 of IS 456 mentioned above.

(b) Concrete shall be manufactured in accordance with clause 10 of above mentioned IS 456 covering quality assurance measures both technical and organizational, which shall also necessarily require a qualified Concrete Technologist to be available during manufacture of

concrete for certification of quality of concrete.

(ii) Minimum M -25 grade of concrete shall be used in all structural elements made with RCC both in load bearing and framed structure.

(iii) The mechanical properties such as modulus of elasticity, tensile strength, creep and shrinkage of fly ash mixed concrete or concrete using fly ash blended cements (PPCs) are not likely to be significantly different and their values are to be taken same as those used for concrete made with OPC.

(iv) To control higher rate of carbonation in early ages of concrete both in fly ash admixed as well as PPC based concrete, water/binder ratio shall be kept as low as possible, which shall be closely monitored during concrete manufacture. If necessitated due to low water/binder ratio, required workability shall be achieved by use of chloride free chemical admixtures conforming to IS 9103. The compatibility of chemical admixtures and super plasticizers with each set OPC, fly ash and /or PPC received from different sources shall be ensured by trials. (v) In environment subjected to aggressive chloride or sulphate attach in particular, use of fly ash admixed or PPC based concrete is recommended. In cases, where structural concrete is exposed to excessive magnesium sulphate, fly ash substitution/content shall be limited to 18% by weight. Special type of cement with low C3A content may also be alternatively used. Durability criteria like minimum binder content and maximum water /binder ratio also need to be given due consideration in such environment. (vi) Wet curing period shall be enhanced to a minimum of 10 days or its equivalent. In hot & arid regions, the minimum curing period shall be 14 days or its equivalent.

5.1.2.2 Use of Fly ash Admixed There shall be no bar on use of (i) Fly ash shall have its chemic 3812 (part I & II) and shall be (ii) To ensure uniform blending needs to be created at site design quality or with similar (iii) As per IS 1489 (Part-I) maxim conforming to IS 3812 (Part (iv) Separate storage for dry fly and permit a free flow and ef in the bins or silos shall be pressure to prevent undue e 5.1.2.3 Use of Fly Ash Blended Ce (i) Subject to General Guideline (Part-I) shall be treated at p use in RCC. (ii) Till the time, BIS makes it m certificate from the PPC man use of such cements in work (iii) While using PPC for structur 5.1.3 Steel for Reinforcement 5.1.3.1 The steel used for reinforcem (a) Mild steel and medium tensil (b) High strength deformed stee (c) Hard drawn steel wire fabric (d) Structural steel conforming to (e) Thermo-mechanically treated 5.1.3.2 Elongation percent on gaug piece. 5.1.3.3 Mild steel is not recommend severe damage and for structures railway and highway bridges. 5.1.3.4 Welding of reinforcement ba requirements of IS 2751. Nominal mass/weight : The tole percentage given in Table 5.1 of th wire of nominal diameter and of den Cement Concrete (FACC) in RCC structures f FACC in RCC structures subject to following addi ical characteristics and physical requirements etc. be duly certified. g of fly ash with cement in conformity with IS 456 te with complete computerized automated process ar facility from Ready Mix Concrete (RMC) plants. ximum 35% of OPC by mass is permitted to be sub rt –I) and same is reiterated. ly ash shall be provided. Storage bins or silos sha efficient

discharge of fly ash. The filter or dust contr e of sufficient size to allow delivery of fly ash main emission of fly ash dust, which may interfere weigh Cements in Cement Concrete (PPCC) in RCC Str ines detailed out as above, PPC manufactured con t par with OPC for manufacture of Design Mix con t mandatory to print the %age of fly ash on each b anufacture indicating the same shall be insisted up rks. ural concrete work, no further admixing of fly ash sh ement shall be any of the following types: sile bars conforming to IS 432 (Part I) el bars conforming to IS 1786 ic conforming to IS 1566 to Grade A of IS 2062 ted (TMT) Bars. uge length is 5.65 A where A is the cross sectiona nded for the use in structures located in earthquake s subjected to dynamic loading (other than wind bars covered in this specification shall be done in a lerance on mass/ weight for round and square the mass/ weight calculated on the basis that the m density 7.85 kg/ cm3 or 0.00785 kg/mm3 conditions. . conforming to IS 56, a specific facility ss control to achieve statute with fly ash all be weather proof troll system provided interned at specified ghing accuracy. structures conforming to IS 1489 concrete for structural h bag of cement, the upon before allowing shall be permitted. nil areas of the test ke zone subjected to ind loading) such as accordance with the e bars shall be the masses of the bar/ wire of nominal diameter and of density 7.85kg/cm^3 0.00785kg/mm^3..

TABLE 5.1

Tolerance on Nominal Mass

nominal size in mm	Tolerance on the Nominal Mass per cent		
	Batch	Individual sample +	Individual sample for coil (x)
(a) Upto and including	±7	-8	±8
(b) Over 10, upto and including 16	±5	-6	±6
Over 16	±3	-4	±4

+ for individual sample plus tolerance is not specified (x) for coil batch tolerance is not applicable Tolerance shall be determined in accordance with method given in IS 1786.

5.1.3.5 High strength deformed bars & wires shall conform to IS 1786. The physical properties for all sizes of steel bars are mentioned below in Table 5.2.

TABLE 5.2

Sl No	Property	Fe 415	Fe 415 D	Fe 500 D	Fe 550 D
(i)	0.2 Per cent	415.0	415.0	500.0	550.0

	Proof stress/ yield stress, Min, N/mm2				
II)	Elongation, per cent, Min. on gauge length 5.65 ·A, where A is the corss-sectional area of the test piece.	14.5	18.0	16.0	14.5
III)	Tensile strength, Min	10 Per cent more than the actual 0.2 per cent proof stress/ yield stress but not less than 485.0 N/mm	12 Per cent more than the actual 0.2 percent proof stress/yield stress but not less than 500.0 N/mm	10 Per cent more than the actual 0.2 per cent proof stress/ yield stress but not less than 565.0 N/mm2	8 Per cent more than the actual 0.2 per cent proof stress/yield stress but not less than 600.0 N/mm2
IV)	Total elongation at maximum force, percent, Min on gauge length 5.65 ·A, where A is the cross-sectional area of the test piece.	-	5	5	5

Tests: Selection and preparation of Test sample. All the tests pieces shall be selected by the Engineer in-Charge or his authorized representative either-
(a) From cutting of bars Or
(b) If he so desires, from any bar after it has been cut to the required or specified size and the test piece taken from and any part of it.

In neither case, the test pieces shall be detached from the bar or coil except in the presence of the Engineer-in-Charge or his authorized representative.

The test pieces obtained in accordance with as above shall be full sections of the bars as rolled and subsequently cold worked and shall be subjected to physical tests without any further modifications. No deduction in size by machining or otherwise shall be permissible. No test piece shall be enacted or otherwise subject to heat treatment. Any straightening which a test piece may require shall be done cold.

Tensile Test: 0.2% proof stress and percentage elongation – This shall be done as per IS 1608, read in conjunction with IS 226.

RE- test: This shall be done as per IS 1786.

Rebend test: This shall be done as per IS 1786.

5.1.3.6 Chemical composition of reinforcement bars shall be as per Table 5.3 as follows:-

TABLE 5.3

Constituent	Maximum Percent			
	Fe415	Fe415D	Fe500D	Fe550D
Carbon	0.3	0.25	0.25	0.25
Sulphur	0.060	0.045	0.040	
Phosphorus	0.060	0.045	0.040	0.040
Sulphur and Phosphorus	0.110	0.085	0.075	0.075

5.1.3.7 Thermo Mechanically treated reinforcement bars: (

a) There is no BIS code for TMT bars. The available code BIS 1786 pertains to HSD Bars. Therefore there should be no stipulation that TMT bars should conform to relevant BIS code.

(b) The TMT bars are being produced under valid license from either of the firms namely Tempcore, Thermex Evcon Turbo & Turbo Quench. These firms have acquired patents and are giving licenses to various producers to produce TMT Bars. (c) The TMT bars shall conform to IS 1786 pertaining to Fe 415 D or Fe 500 D or Fe grade of steel as specified.

(d) In design and construction of reinforced concrete building in seismic zone III and above, steel reinforcement of Grade Fe 415 D shall be used. However, high strength deformed steel bars, produced by thermo mechanical treatment process of grade Fe 415, Fe 500 and Fe 550 having elongation more than 14.5. % and conform to other requirements of Fe 415 D, Fe 500 D and Fe 550 D respectively of IS 1786 may also be used for reinforcement. In future, latest provision of IS 456 and IS 13920 or any other relevant code as modified from time to time shall be applicable.

5.1.4 Stacking and Storage Steel for reinforcement shall be stored in such a way as to prevent distorting and corrosion. Care shall be taken to protect the reinforcement from exposure to saline atmosphere during storage, fabrication and use. It may be achieved by treating the surface of reinforcement with cement wash or by suitable methods. Bars of different classifications, sizes and

lengths shall be stored separately to facilitate issue in such sizes and lengths to cause minimum wastage in cutting from standard length.

5.1.5 Identification Care shall also be taken to properly identify these bars at site. The staff shall be specially trained for looking for identification marks on these bars given by the manufacturers which are generally given colour code. It will be advisable to see that only one type/grade of bars are brought to site and used in the project after conducting tests for each lot. 5.2 FORM WORK (CENTRING & SHUTTERING) 5.2.1 Form Work Form work shall include all temporary or permanent forms or moulds required for forming the concrete which is cast-in-situ, together with all temporary construction required for their support.

5.2.3 General Requirement It shall be strong enough to withstand the dead and live loads and forces caused by ramming and vibrations of concrete and other incidental loads, imposed upon it during and after casting of concrete. It shall be made sufficiently rigid by using adequate number of ties and braces, screw jacks or hard board wedges where required shall be provided to make up any settlement in the form work either before or during the placing of concrete. Form shall be so constructed as to be removable in sections in the desired sequence, without damaging the surface of concrete or disturbing other sections, care shall be taken to see that no piece is keyed into the concrete. 5.2.3.1 Material for Form Work (a) Propping and Centering : All propping and centering should be either of steel tubes with extension pieces or built up sections of rolled steel. 5.2.3.2 (a) Centering/Staging : Staging should be as designed with required extension pieces as approved by Engineer-in-Charge to ensure proper slopes, as per design for slabs/ beams etc. and as per levels as shown in drawing. All the staging to be either of Tubular steel structure with adequate bracings as approved or made of built up structural sections made form rolled structural steel sections. (b) In case of structures with two or more floors, the weight of concrete, centering and shuttering of any upper floor being cast shall be suitably supported on one floor below the top most floor already cast.

(c) Form work and concreting of upper floor shall not be done until concrete of lower floor has set at least for 14 days. 5.2.3.3 Shuttering: Shuttering used shall be of sufficient stiffness to avoid excessive deflection and joints shall be tightly butted to avoid leakage of slurry. If required, rubberized lining of material as approved by the Engineer-in-Charge shall be provided in the joints. Steel shuttering used or concreting should be sufficiently stiffened. The steel shuttering should also be properly repaired before use and properly cleaned to avoid stains, honey combing, seepage of slurry through joints etc. (a) Runner Joists: RSJ, MS Channel or any other suitable section of the required size shall be used as runners. (b) Assembly of beam head over props. Beam head is an adopter that fits snugly on the head plates of props to provide wider support under beam bottoms. (c) Only steel shuttering shall be used, except for unavoidable portions and very small works for which 12 mm thick water proofing ply of approved quality may be used. 5.2.3.4 Form work shall be properly designed for self weight, weight of reinforcement, weight of fresh concrete, and in addition, the various live loads likely to be imposed during the construction process (such as workmen, materials and equipment). In case the height of

centering exceeds 3.50 metres, the prop may be provided in multi-stages. A typical detail of multistage shuttering is given in Fig. 5.9.

5.2.3.5 Camber: Suitable camber shall be provided in horizontal members of structure, especially in cantilever spans to counteract the effect of deflection. The form work shall be so assembled as to provide for camber. The camber for beams and slabs shall be 4 mm per metre (1 to 250) or as directed by the Engineer-in- Charge, so as to offset the subsequent deflection, For cantilevers the camber at free end shall be 1/50th of the projected length or as directed by the Engineer-in-Charge. 5.2.3.5.1 Typical arrangement of form work for 'beams, columns and walls' are shown in Figures 5.1 to 5.8 and form secured by wall ties is shown in Fig. 5.3.

5.2.3.6 Walls : The form faces have to be kept at fixed distance apart and an arrangement of wall ties with spacer tubes or bolts is considered best. A typical wall form with the components identified is given in Fig. 5.1, 5.2 & 5.3. The two shutters of the wall are to be kept in place by appropriate ties, braces and studs, some of the accessories used for wall form are shown in Fig. 5.3. 5.2.3.7 Removal of Form work (Stripping Time) : In normal circumstance and where various types of cements are used, forms, may generally be removed after the expiry of the following periods:

Type of Form work	Minimum period Before Striking Form work for OPC 33 grade	Minimum period Before Striking Form work for OPC	Minimum period Before Striking Form work for PPC
(a)Vertical form work to columns, walls, beams	16-24 h	16-24 h	24-36 h
b) Soffit form work to slabs (Props to be refixed immediately after removal of formwork)	3days	3days	4days
c) Soffit form work to beams (Props to be refixed immediately after removal of formwork	7days	7days	10days
d) Props to slabs: (1) Spanning upto 4.5m (2) Spanning over 4.5m	7 days 14 days	7 days 14 days	10 days 20 days
e) Props to beams and arches: (1) Spanning	14 days 21 days	14 days 21 days	20 days 30 days

upto 6m (2) Spanning over 6m			

Note 1: For other types of cement, the stripping time recommended for ordinary Portland cement may be suitably modified. Generally If Portland Pozzolana or low heat cement or OPC with direct addition of fly ash has been used for concrete, the stripping time will be 10/7 of the period stated for OPC with 43 grade cement above.

Note 2: The number of props left under, their sizes and disposition shall be such as to be able to safely carry the full dead load of the slabs, beam or arch as the case may be together with any live load likely to occur during curing or further construction.

Note 3: For rapid hardening cement, 3/7 of above periods for OPC 33 grade will be sufficient in all cases except for vertical side of slabs, beams and columns which should be retained for at least 24 hours.

Note 4: In case of cantilever slabs and beams, the centering shall remain till structures for counter acting or bearing down have been erected and have attained sufficient strength. Note 5: Proper precautions should be taken to allow for the decrease in the rate of hardening that occurs with all types of cement in cold weather and accordingly stripping time shall be increased.

Note 6: Work damaged through premature or careless removal of forms shall be reconstructed within 24 hrs.

5.2.4 Surface Treatment

5.2.4.1 Oiling the Surface : Shuttering gives much longer service life if the surfaces are coated with suitable mould oil which acts both as a parting agent and also gives surface protections. A typical mould oil is heavy mineral oil or purified cylinder oil containing not less than 5% pentachlorophenol conforming to IS 716 well mixed to a viscosity of 70-80 centipoises. After 3-4 uses and also in cases when shuttering has been stored for a long time, it should be recoated with mould oil before the next use. The second categories of shuttering oils / leavening agents are Polymer based water soluble Compounds. They are available as concentrates and when used diluted with water in the ratio of 1:20 or as per manufacturer specifications. The diluted solution is applied by brush applications on the shuttering both of steel as well as ply wood. The solution is applied after every use.

5.2.4.2 The design of form work shall conform to sound Engineering practices and relevant IS codes.

5.2.5 Inspection of Form Work The completed form work shall be inspected and approved by the Engineer-in-Charge before the reinforcement bars are placed in position. Proper form work should be adopted for concreting so as to avoid honey combing, blow holes, grout loss, stains or discoloration of concrete etc. Proper and accurate alignment and profile of finished concrete surface will be ensured by proper designing and erection of form work which will be approved by Engineer-in-Charge. Shuttering surface before concreting should be free from any defect / deposits and full cleaned so as to give perfectly straight smooth concrete surface. Shuttering surface should be therefore checked for

any damage to its surface and excessive roughness before use

5.2.5.1 Erection of Form Work (Centering and shuttering): Following points shall be borne in mind while checking during erection. (a) Any member which is to remain in position after the general dismantling is done, should be clearly marked. (b) Material used should be checked to ensure that, wrong items/ rejects are not used. (c) If there are any excavations nearby which may influence the safety of form works, corrective and strengthening action must be taken. (d) (i) The bearing soil must be sound and well prepared and the sole plates shall bear well on the ground. (ii) Sole plates shall be properly seated on their bearing pads or sleepers. (iii) The bearing plates of steel props shall not be distorted. (iv) The steel parts on the bearing members shall have adequate bearing areas. (e) Safety measures to prevent impact of traffic, scour due to water etc. should be taken. Adequate precautionary measures shall be taken to prevent accidental impacts etc. (f) Bracing, struts and ties shall be installed along with the progress of form work to ensure strength and stability of form work at intermediate stage. Steel sections (especially deep sections) shall be adequately restrained against tilting, over turning and form work should be restrained against horizontal loads. All the securing devices and bracing shall be tightened. (g) The stacked materials shall be placed as catered for, in the design. (h) When adjustable steel props are used. They should: 1. be undamaged and not visibly bent. 2. have the steel pins provided by the manufacturers for use. 3. be restrained laterally near each end. 4. have means for centralizing beams placed in the forkheads. (i) Screw adjustment of adjustable props shall not be over extended.

(j) Double wedges shall be provided for adjustment of the form to the required position wherever any settlement/ elastic shorting of props occurs. Wedges should be used only at the bottom end of single prop. Wedges should not be too steep and one of the pair should be tightened/ clamped down after adjustment to prevent shifting. (k) No member shall be eccentric upon vertical member. (l) The number of nuts and bolts shall be adequate.

All provisions of the design and/or drawings shall be complied with. (n) Cantilever supports shall be adequate. (o) Props shall be directly under one another in multistage constructions as far as possible. (p) Guy ropes or stays shall be tensioned properly. (q) There shall be adequate provision for the movements and operation of vibrators and other construction plant and equipment. (r) Required camber shall be provided over long spans. (s) Supports shall be adequate, and in plumb within the specified tolerances.

5.2.5.2 Guidelines for Multistage Certering: The proper handling the situation of multistage centering in buildings or where height of casting of concrete is higher than normal height of 3.5 M or where higher loadings are coming during casting of concrete or large span structures and in situations of casting of some special structures like Domes, Vaults etc. In all situations, centering/scaffolding/staging for casting of these structures should be properly designed by a qualified and experienced person/agency having past experience in design of false work (centering) for concrete structures and should be proof checked by similar experienced person/ agency and it

should be properly approved and issued to contractor by Engineer-In-Charge. The provisions of clause 7 of IS:14687 may be referred for design of false work (centering). A method statement for erection and dismantling of the centering/scaffolding/staging and process of concreting shall be prepared by contractor and submitted to Engineer-in-Charge for approval and the work shall be commenced only after approval of method statement by Engineer-in-Charge. The provisions of clause 9 of IS:14687 may be referred for erection of false work (centering), safety precautions and other site operations, pertaining to false work (centering). Experienced form watcher shall be engaged during erection, concreting and dismantling for early detection of any movement or instability in the system. The field engineers shall ensure that CPWD specifications and provisions of BIS codes are strictly followed.

A detailed programme of field safety inspection of centering/scaffolding/form work of such structures during different stages should be chalked out and strictly followed. Provision of safety net, fall arresting system including other safety gears, for workers, working over these structures shall be made in contract and should be followed strictly. 5.2.6 MEASUREMENTS 5.2.6.1 General : The form work shall include the following: (a) Splayed edges, notching, allowance for overlaps and passing at angles, sheathing battens, strutting, bolting, nailing, wedging, easing, striking and removal. (b) All supports, struts, braces, wedges as well as mud sills, piles or other suitable arrangements to support the form work. (c) Bolts, wire, ties, clamps, spreaders, nails or any other items to hold the sheathing together. (d) Working scaffolds, ladders, gangways, and similar items. (e) Filleting to form stop chamfered edges of splayed external angles not exceeding 20mm wide to beams, columns and the like.

i) Where required, the temporary openings provided in the forms for pouring concrete, inserting vibrators, and cleaning holes for removing rubbish from the interior of the sheathing before pouring concrete. (g) Dressing with oil to prevent adhesion and (h) Raking or circular cutting.

5.2.6.2 Classification of Measurements: Where it is stipulated that the form work shall be paid for separately, measurements shall be taken of the area of shuttering in contact with the concrete surface. Dimensions of the form work shall be measured correct to a cm. The measurements shall be taken separately for the following. (a) Foundations, footings, bases of columns etc. and for mass concrete (b) Walls (any thickness) including attached pilasters, buttresses, plinth and string courses etc. (c) Suspended floors, roofs, landings, shelves and their supports and balconies. (d) Lintels, beams, plinth beams, girders, bressummers and cantilevers. (e) Columns, pillars, piers, abutments posts and struts. (f) Stairs (excluding landings) except spiral staircase. (g) Spiral staircases (including landings). (h) Arches, Domes, vaults, shells roofs, arch ribs, curvilinear shaped folded plates (i) Extra for arches, domes, vaults exceeding 6 m span other than curvilinear shaped (j) Chimneys and shafts. (k) Well steining. (l) Vertical and horizontal fins individually or forming box, louvers and bands.facias and eaves board (m) Waffle or ribbed slabs. (n) Edges of slabs and breaks in floors and walls (to be measured in running metres where below 200 mm in width or thickness). (o) Cornices and mouldings.

(p) Small surfaces, such as cantilevers ends, brackets and ends of steps, caps and boxes to pilasters and columns and the like. (q) Chullah hoods, weather shades, chajjas, corbels etc. including edges and (r) Elevated water reservoirs. 5.2.6.3 Centering, and shuttering where exceeding 3.5 metre height in one floor shall be measured and paid for separately. 5.2.6.4 Where it is not specifically stated in the description of the item that form work shall be paid for separately, the rate of the RCC item shall be deemed to include the cost of form work. 5.2.6.5 No deductions from the shuttering due to the openings/ obstructions shall be made if the area of each openings/ obstructions does not exceed 0.4 square metre. Nothing extra shall be paid for forming such openings.

5.2.6.6 Form work of elements measured under categories of arches, arch ribs, domes, spiral staircases, well steining, shell roofs, curvilinear folded plates & curvilinear eaves board, circular shafts & chimneys shall not qualify for extra rate for circular work. 5.2.6.7 Extra for circular work shall be admissible for surfaces circular or curvilinear in plan or in elevation beyond the straight edge of supporting beam in respective mode of measurement. However, there may be many different types of such structures. In such cases, extra payment shall be made judiciously after deducting areas where shuttering for circular form work is not involved. 5.2.7 Rate The rate of the form work includes the cost of labour and materials required for all the operations described above.

5.3 REINFORCEMENTS 5.3.1 General Requirements Steel conforming to para 5.1.3 for reinforcement shall be clear and free from loose mill scales, dust, loose rust, coats of paints, oil or other coating which may destroy or reduce bond. It shall be stored in such a way as to avoid distortion and to prevent deterioration and corrosion. Prior to assembly of reinforcement on no account any oily substance shall be used for removing the rust. 5.3.1.1 Assembly of Reinforcement : Bars shall be bent correctly and accurately to the size and shape as shown in the detailed drawing or as directed by Engineer- in-Charge. Preferably bars of full length shall be used. Necessary cutting and straightening is also included. Overlapping of bars, where necessary shall be done as directed by the Engineer-in-Charge. The overlapping bars shall not touch each other and these shall be kept apart with concrete between them by 25mm or 11 / 4 times the maximum size of the coarse aggregate whichever is greater. But where this is not possible, the overlapping bars shall be bound together at intervals not exceeding twice the dia. of such bars with two strands annealed steel wire of 0.90 mm to 1.6 mm twisted tight. The overlaps/ splices shall be staggered as per directions of the Engineer-in-Charge. But in no case the overlapping shall be provided in more than 50% of cross sectional area at one section.

5.3.1.2 Bonds and Hooks Forming End Anchorages: Reinforcement shall be bent and fixed in accordance with procedure specified in IS 2502, code of practice of bending and fixing of bars for concrete reinforcement. The details of bends and hooks are shown below for guidance. (a) U-Type Hook In case of mild steel plain bars standard U type hook shall be provided by bending ends of rod into semicircular hooks having clear diameter equal to four times the diameter of the bar. Note: In case of work in seismic zone, the size of hooks at the end of the rod shall be eight times the diameter of bar or as given in the structural drawings. (b) Bends Bend forming anchorage to a M.S. plain bar

shall be bent with and internal radius equal to two times the diameter of the bar with a minimum length beyond the bend equal to four times the diameter of the bar.

5.3.1.3 Anchoring Bars in Tension : Deformed bars may be used without end anchorages provided, development length equipment is satisfied. Hooks should normally be provided for plain bars in tension. Development length of bars will be determined as per IS: 456. 5.3.1.4 Anchoring Bars in Compression : The anchorage length of straight bar in compression shall be equal to the 'Development length' of bars in compression as specified in IS: 456. The projected length of hooks, bend and straight lengths beyond bend, if provided for a bar in compression, shall be considered for development length. 5.3.1.5 Binders, stirrups, links etc. : In case of binders, stirrups, links etc. the straight portion beyond the curve at the end shall be not less than eight times the nominal size of bar. 5.3.2 Welding of Bars Wherever facility for electric arc welding or gas pressure welding is available, welding of bars shall be done in lieu of overlap. The location and type of welding shall be got approved by the Engineer-in-Charge. Welding shall be as per IS 2751 and 9417. 5.3.3 Placing in Position 5.3.3.1 Fabricated reinforcement bars shall be placed in position as shown in the drawings or as directed by the Engineer -in -charge. The bars crossing one another shall be tied together at every intersection with two strands of annealed steel wire 0.9 to 1.6 mm thickness twisted tight to make the skeleton of the steel work rigid so that the reinforcement does not get displaced during deposition of concrete. Tack welding in crossing bars shall also be permitted in lieu of binding with steel wire if approved by Engineer-in-Charge.

5.3.3.2 The bars shall be kept in correct position by the following methods: (a) In case of beam and slab construction pre-cast cover blocks in cement mortar 1:2 (1 cement : 2 coarse sand) about 4x4 cm section and of thickness equal to the specified cover shall be placed between the bars and shuttering, so as to secure and maintain the requisite cover of concrete over reinforcements. (b) In case of cantilevered and doubly reinforced beams of slabs, the vertical distance between the horizontal bars shall be maintained by introducing chairs, spacers or support bars of steel at 1.0 mere or at shorter spacing to avoid sagging. (c) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them: or with clock of cement mortar 1:2 (1 cement: 2 coarse sand) of required size suitable tied to the reinforcement to ensure that they are in correct position during concreting. (d) In case of other R.C.C. structure such as arches, domes, shells, storage tanks etc. a combination of cover blocks, spacers and templates shall be used as directed by Engineer-in-Charge. 5.3.3.3 Tolerance on Placing of Reinforcement: Unless otherwise specified by the Engineer-in Charge, reinforcement shall be placed within the following tolerances: Tolerance in spacing (a) For effective depth, 200 mm or less +10 mm (b) For effective depth, more than 200 mm + 15 mm 5.3.3.4 Bending at Construction Joints : Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original position care should be taken to ensure that at no time the radius of the bend is less than 4 bar diameters for plain mild steel or 6 bar diameter for deformed bars. Care shall also be taken when bending back bars to ensure that the concrete

around the bar is not damaged

5.3.3.5 Cover : The minimum nominal cover to meet durability requirements shall be as under:- Exposure Nominal Concrete cover in mm not less than Mild 20 Moderate 30 Severe 45 Very severe 50 Extreme 75 Notes : 1. For main reinforcement upto 12 mm diameter bar for mild exposure the nominal cover may be reduced by 5 mm. 2. Unless specified otherwise, actual concrete cover should not deviate from the required nominal cover by + 10 mm. 3. For exposure condition 'severe' and 'very severe' reduction of 5 mm may be made, where concrete grade is M35 and above. 4. Nominal cover to meet specified period of fire resistance shall not be less than as given in Table 16A of IS 456. 5.3.4 Measurement Reinforcement including authorized spacer bars and lappages shall be measured in length of different diametre, as actually (not more than as specified in the drawings.) used in the work nearest to a centimetre and their weight calculated on the basis of standard weight given in Table 5.4 below. In case actual unit weight of the bars is less than standard unit weight, but within variation, in such cases weight of reinforcement shall be calculated on the basis of actual unit weight. Wastage and unauthorized overlaps shall not be paid for. Annealed steel wire required for binding or tack welding shall not be measured, its cost being included in the rate of reinforcement. Where tack welding is used in lieu of binding, such welds shall not be measured. Chairs separators etc. shall be provided as directed by the Engineer-in-Charge and measured separately and paid for.

5.3A STEEL FOR REINFORCEMENT READY TO USE "CUT & BEND" 5.3A.1 Cut and bend rebars are customised reinforced steel bars required at construction sites. These shall be made from specialized machinery ensuring exact precision, ready to use pre-cut and pre-bent as per approval drawings. The steel used for reinforcement shall be the following types. (a) Thermo-mechanically treated (TMT) Bars. 5.3A.2 Elongation percent on gauge length is 5.65A, where A is the cross sectional area of the test piece. 5.3A.3 Welding of reinforcement bars covered in this specification shall be done in accordance with the requirement of IS 2751. Nominal mass / weight:- The tolerance on mass / weight for round and square bars shall be the percentage given in Table 5.4A of the mass / weight calculated on the basis that the masses of the bar / wire of nominal diameter and of density 7.85 Kg / cm^3 or 0.00785 kg / mm^3.

5.3A.7 Assembly of Rebars 5.3A.7.1 The rebars shall be bend correctly and precisely to the size and shape as shown in the detailed drawing or as directed by Engineer-in-charge. Overlapping of bars, where necessary shall be done as directed by the Engineer-in-charge. The overlapping bars shall not touch each other and these shall be kept apart with concrete between them by 25 mm or 1¼ times the maximum size of the coarse aggregate whichever is greater. But where this is not possible, the overlapping bars shall be bound together at intervals not exceeding twice the dia. of such bars with two strands annealed steel wire of 0.90 mm to 1.6 mm twisted light. The overlaps / splices shall be staggered as per direction of the Engineer-in-charge. But in no case the overlapping shall be provided in more than 50% of cross sectional area at one section. 5.3A.7.2 Bonds and Hooks Forming End

Anchorages:-Reinforcement shall be bent and fixed in accordance with procedure specified in IS 2502, code of practice of bending and fixing of bars for concrete reinforcement. 5.3A.7.3 Anchorages Bars in Tension:-Deformed bars may be used without end anchorages Development length of bars will be determined as per IS: 456. 5.3A.7.4 Anchorages Bars in Compression:-The anchorages length of straight bar in compression shall be equal to the 'Development length' of bars in compression as specified in IS: 456. The projected length of bend and straight length beyond bend, if provided for a bar in compression, shall be considered for development length. 5.3A.7.5 Binders, stirrups, link etc:-In case of binders, stirrups, link etc. the straight portion beyond the curve at the end shall be not less than eight times the nominal size of bar. 5.3A.8 Welding of Bars. Wherever facility for electric arc welding or gas pressure welding is available, welding of bars shall be done in lieu of overlap. The location and type of welding shall be got approved by the Engineer in-charge. Welding shall be as per IS 2751 and 9417. 5.3A.9 Placing in Position 5.3A.9.1 Fabricated reinforcement bars shall be placed in position as shown in the drawings or as directed by the Engineer-in-charge. The bars crossing one another shall be tied together at every intersection with two strands of annealed steel wire 0.9 to 1.6 mm thickness twisted tight to make the skeleton of the steel work rigid so that the reinforcement does not get displaced during deposition of concrete. Tack welding in crossing bars shall also be permitted in lieu of binding with steel wire if approved by Engineer-in-charge. 5.3A.9.2 The bars shall be kept in correct position by the following methods: (a) In case of beam and slab construction pre-cast cover blocks in cement mortar 1:2 (1cement : 2 coarse sand) about 4 x 4 cm section and of thickness equal to the specified cover shall be placed between the bars and shuttering, so as to secure and maintain the requisite cover of concrete over reinforcements.

In case of cantilevered and doubly reinforced beams of slabs, the vertical distance between the horizontal bars shall be maintained by introducing chairs, spacers or support bars of steel at 1.0 metre or at shorter spacing to avoid sagging. (c) In case of columns and walls, the vertical bars shall be kept in position by means of timber templates with slots accurately cut in them or with block of cement mortar 1:2 (1 cement : 2 coarse sand) of required size suitable tied to the reinforcement to ensure that they are in correct position during concreting. (d) In case of other R.C.C. structure such as arches, domes, shells, storage tank etc. a combination of cover blocks, spacers and templates shall be used as directed by Engineer-in-charge.

5.3A.9.3 Tolerance on Placing of Reinforcement:-Unless otherwise specified by the Engineer in-charge, reinforcement shall be placed within the following tolerances. Tolerance in spacing (a) For effective depth, 200 mm or less + 10 mm (b) For effective depth, more than 200 mm + 15 mm

5.3A.9.4 Bending at Construction Joints:-Where reinforcement bars are bent aside at construction joints and afterwards bent back into their original position, care should be taken to ensure that at no time the radius of the bend is less than 6 bars diameter. Care should also be taken when bending back bars to ensure that the concrete around the bar is not damaged. 5.3A.9.5 Cover:-The minimum nominal cover to meet durability requirements shall be as under:-

Note : 1. For main reinforcement upto 12 mm diameter bar for mild exposure the nominal cover may be reduced by 5 mm. 2. Unless specified otherwise, actual concrete cover should not deviate from the required nominal cover by + 10 mm. 3. For exposure condition 'severe' and 'very severe' reduction of 5 mm may be made, where concrete grade is M 35 and above. 4. Nominal cover to meet specified period of fire resistance shall not be less than as given in Table 16A of IS 456. 5.3A.10 Measurement The Measurement shall be as specified under para 5.3.4 5.3A.11 Rate The Measurement shall be as specified under para 5.3.5

5.3B REINFORCEMENT COUPLERS 5.3B.1 General requirement of material Reinforcement coupler shall have adequate strength, length and internal threads as per manufacturer's design to be able to meet the performance requirement as per IS Code. All reinforcement coupler shall be finished smooth and shall be free from burrs, cracks and other manufacturing defects. The threads shall be clearly formed and shall be free from imperfections. The nominal sizes of reinforcement couplers based on their internal diameter shall correspond to the size of bars covered under IS Code 1786. Each coupler should be identifiable by marks/ brands which indicate name of manufacture or their brand name, class designation, nominal size and grade of reinforcement for which it is intended and BIS standard mark. 5.3B.2 Performance Requirement: All reinforcement couplers shall meet the performance requirements as per IS Code 16172:2014 clause 9.2, 9.3, 9.4 and 9.5.1. Class H couplers in addition to above shall also meet requirement of clause 9.5.2 of IS Code 16172:2014. The static tensile test shall constitute acceptance test. 5.3B.3 Sampling and criteria for conformity: Sampling and criteria for conformity shall be as per Annexure 'F' of IS Code 16172:2014 5.3B.4 Installation procedure/ instructions:The manufacturer/ supplier shall provide written installation instructions. The installation instructions shall be clear and understandable. The described installation procedure of reinforcement coupler shall be repeatable and able to achieve its performance under different job site circumstances. 5.3B.5 Measurement :The reinforcement couplers shall be measured in numbers. 5.3B.6 Rate : The rate shall be inclusive of all materials &labour involved in fixing parallel threaded couplers to reinforcement bars. 5.4 CONCRETING 5.4.0 The concrete shall be as specified under chapter 4 concrete work. The proportion by volume or by the weight of ingredients shall be as specified. 5.4.1 Consistency The concrete which will flow sluggishly into the forms and around the reinforcement without any segregation of coarse aggregate from the mortar shall be used. The consistency shall depend on whether the concrete is vibrated on or hand tamped, it shall be determined by slump test as prescribed in sub-head "concrete" under workability – requirement. 5.4.2 Placing of Concrete 5.4.2.1 Concreting shall be commenced only after Engineer-in-Charge has inspected the centering, shuttering and reinforcement as placed and passed the same. Shuttering shall be clean and free from all shavings, saw dust, pieces of wood, or other foreign material and surfaces shall be treated as prescribed in 5.2.4. 5.4.2.2 In case of concreting of slab and beams, wooden plank or cat walks of chequerred MS plated or bamboo chalies or any other suitable material supported directly on the centering by means of wooden blocks or lugs shall be provided to convey the concrete to the place of

deposition without disturbing the reinforcement in any way. Labour shall not be allowed to walk over the reinforcement.

5.4.2.3 In case of columns and wall, it is desirable to place concrete without construction joints. The progress of concreting in the vertical direction, shall be restricted to one metre per hour. 5.4.2.4 The concrete shall be deposited in its final position in a manner to preclude segregation of ingredients. In deep trenches and footings concrete shall be placed through chutes or as directed by the Engineer-in-Charge. In case of columns and walls, the shuttering shall be so adjusted that the vertical drop of concrete is not more than 1.5 metres at a time. 5.4.2.5 During cold weather, concreting shall not be done when the temperature falls below 4.50C. The concrete placed shall be protected against frost by suitable covering. Concrete damaged by frost shall be removed and work redone. 5.4.2.6 During hot weather precaution shall be taken to see that the temperature of wet concrete does not exceed 38ºC. No concrete shall be laid within half an hour of the closing time of the day, unless permitted by the Engineer-in-Charge. 5.4.2.7 It is necessary that the time between mixing and placing of concrete shall not exceed 30 minutes so that the initial setting process is not interfered with. 5.4.3 Compaction It shall be as specified in sub-head of Concrete Work of this specification. 5.4.3.1 Concrete shall be compacted into dense mass immediately after placing by means of mechanical vibrators designed for continuous operations complying with IS 2505, IS 2506, IS 2514 and IS 4656. The Engineer- in- Charge may however relax this condition at his discretion for certain items depending on the thickness of the members and feasibility of vibrating the same and permit hand compaction instead. Hand compaction shall be done with the help of tamping rods so that concrete is thoroughly compacted and completely worked around the reinforcement, embedded fixtures, and into corners of the form. The layers of concrete shall be so placed that the bottom layer does not finally set before the top layer is placed. The vibrators shall maintain the whole of concrete under treatment in an adequate state of agitation; such that de-aeration and effective compaction is attained at a rate commensurate with the supply of concrete from the mixers. The vibration shall continue during the whole period occupied by placing of concrete, the vibrators being adjusted so that the center of vibrations approximates to the center of the mass being compacted at the time of placing. 5.4.3.2 Concrete shall be judged to be properly compacted, when the mortar fills the spaces between the coarse aggregate and begins to cream up to form an even surface. When this condition has been attained, the vibrator shall be stopped in case of vibrating tables and external vibrators. Needle vibrators shall be withdrawn slowly so as to prevent formation of loose pockets in case of internal vibration. In case both internal and external vibrators are being used, the internal vibrator shall be first withdrawn slowly after which the external vibrators shall be stopped so that no loose pocket is left in the body of the concrete. The specific instructions of the makers of the particular type of vibrator used shall be strictly complied with. Shaking of reinforcement for the purpose of compaction should be avoided. Compaction shall be completed before the initial setting starts, i.e. with 30 minutes of addition of water to the dry mixture. 5.4.3.3 In case of roof slabs the top surface shall be finished even and smooth with wooden trowel, before the

concrete begins to set. Sprinkling of dry cement while finishing shall not be resorted to

5.4.4 Construction joints 5. 4.4.1 Joints are a common source of weakness and, therefore, it is desirable to avoid them. If this is not possible, their number shall be minimized. Concreting shall be carried out continuously up to construction joints, the position and arrangement of which shall be indicated in Fig 5.26 or as directed by Engineer-in-Charge. 5.4.4.2 In case of columns the joints shall be horizontal and 10 to 15 cm below the bottom of the beam running into the column head. The portion of the column between the stepping off level and the top of the slab shall be concreted with the beam. 5.4.4.3 When stopping the concrete on a vertical plane in slabs and beams, and approved stop board (see Fig. 26C) shall be placed with necessary slots for reinforcement bars or any other obstruction to pass the bars freely without bending. The construction joints shall be keyed by providing a triangular or trapezoidal fillet nailed on the stop board. Inclined or feather joints shall not be permitted. Any concrete flowing through the joints of stop board shall be removed soon after the initial set. When concrete is stopped on a horizontal plane, the surface shall be roughened and cleaned after the initial set. 5.4.4.4 When the work has to be resumed, the joint shall be thoroughly cleaned with wire brush and loose particles removed. A coat of neat cement slurry at the rate of 2.75 kg of cement per square metre shall then be applied on the roughened surface before fresh concrete is laid.

5.4.5 Expansion Joints Expansion joints shall be provided as shown in the structural drawings or as indicated in Fig. 5.10 to 5.25 or as directed by Engineer-in-Charge, for the purpose of general guidance. However it is recommended that structures exceeding 45 m in length shall be divided by one or more expansion joints. The filling of these joints with bitumen filler, bitumen felt or any such material and provision of copper plate, etc. shall be paid for separately in running metre. The measurement shall be taken two places of decimal stating the depth and width of joint. 5.4.6 Curing After the concrete has begun to harden i.e. about 1 to 2 hours after its laying, it shall be protected from quick drying by covering with moist gunny bags, sand, canvass Hessian or any other material approved by the Engineer-in-Charge. After 24 hours of laying of concrete, the surface shall be cured by ponding with water for a minimum period of 7 days from the date of placing of concrete in case of OPC and at least 10 days where mineral admixtures or blended cements are used. The period of curing shall not be less than 10 days for concrete exposed to dry and hot weather condition.

5.4.7 Rectification of Surface defects of Minor nature Immediately on removal of forms, the R.C.C. work shall be examined by the Engineer-in-Charge, before any defects are made good. (a) The work that has sagged or contains honey combing to an extent detrimental to structural safety or architectural concept shall be rejected as given in para 5.4.9.4 for visual inspection test. (b) Surface defects of minor nature may be accepted. On acceptance of such a work by the Engineer-in-Charge, the same shall be rectified as follows: 1. Surface defects which require repair when forms are removed, usually consist of bulged due to movement of forms, ridges at form joints, honey-combed areas, damage resulting from the stripping of forms and bolt holes, bulges and ridges are removed by careful chipping or tooling and the surface is then rubbed with a grinding stone. Honey-combed and

other defective areas must be chipped out, the edges being cut as straight as possible and perpendicularly to the surface, or preferably slightly under cut to provide a key at the edge of the patch.

Shallow patches are first treated with a coat of thin grout composed of one part of cement and one part of fine sand and then filled with mortar similar to that used in the concrete. The mortar is placed in layers not more than 10mm thick and each layer is given a scratch finish to secure bond with the succeeding layer. The last layer is finished to match the surrounding concrete by floating, rubbing or tooling on formed surfaces by pressing the form material against the patch while the mortar is still plastic. 3. Large and deep patches require filling up with concrete held in place by forms. Such patches are reinforced and carefully dowelled to the hardened concrete. 4. Holes left by bolts are filled with mortar carefully packed into places in small amounts. The mortar is mixed as dry as possible, with just enough water so that it will be tightly compacted when forced into place. 5. Tiered holes extending right through the concrete may be filled with mortar with a pressure gun similar to the gun used for greasing motor cars. 6. Normally, patches appear darker than the surrounding concrete, possibly owing to the presence on their surface of less cement laitance. Where uniform surface colour is important, this defect shall be remedied by adding 10 to 20 percent of white Portland cement to the patching mortar, the exact quantity being determined by trial. 7. The same amount of care to cure the materials in the patches should be taken as with the whole structure. Curing must be started as soon as possible, after the patch is finished to prevent early drying. Damp Hessian may be used but in some locations it may be difficult to hold it in place. A membrane curing compound in these cases will be most convenient.

Whenever required, The exposed surface of R.C.C. work shall be plastered with cement mortar 1:3 (1 cement : 3 fine sand) of thickness not exceeding 6 mm to give smooth and even surface true to line and form. Any RCC surface which remains permanently exposed to view in the completed structure, shall be considered exposed surfaced for the purpose of this specification. (d) The surface which is to receive plaster or where it is to be joined with brick masonry wall, shall be properly roughened immediately after the shuttering is removed, taking care to remove the laitance completely without disturbing the concrete. The roughening shall be done by hacking. Before the surface is plastered, it shall be cleaned and wetted so as to give bond between concrete and plaster. RCC work shall be done carefully so that the thickness of plaster required for finishing the surface is not more than 6 mm. (e) The surface of RCC slab on which the cement concrete or mosaic floor is to be laid shall be roughened with brushes while the concrete is green. This shall be done without disturbing the concrete.

10. VIDING AND INSTALLING ALUMINIUM ROOFING SHEETS

Providing and installing Aluminium roofing sheets of Hi-Crest Profile - 1144 mm overall width , Alloy AA 3105 Bare Finish/ Mill Finish with thickness 0.91 mm, as per IS 1254-2007, nominal 46 mm deep ribs, Aluminium coil made from virgin Aluminium confirming/compliance to chemical composition & mechanical properties as per IS 737-2008 and temper H18 with minimum

warranty period of 15-20 years, to be fixed with Aluminium J/L Bolts over the existing purlins, rafters, channels and trusses etc., complete. (Rate excluding the cost of J/L Bolts) including all other incidental charges with all lead, lift etc.as directed by the Engineer in-charge.

11. PROVIDING AND SUPPLYING OF

Providing and supplying of Aluminium "L" Bolt of 8 mm dia rod , tread diameter 9.35, tread length 65 mm, "L" Blot size: 360 x 65 x 30mm of Alloy AA6082 Temper T4 of reputed manufacturer with square nut 16x16x6 mm Alloy 6082 temper T4 or T6, Aluminium plain washer 32 mm dia, 1.22 mm thickness of reputed manufacturer, Alloy 8011 h14, Bitumious Washer 20mm dia 1.5mm thickness, EPDM 22mm dia 1.5mm thickness with all lead, lift, etc. complete as directed by Engineer in-charge.

12. Providing, fabrication and errection

Providing, fabrication and errection, of M.S. steel channels, angles M.S. flats, fixing in position for roof top to fix the roofing sheet as per approved design, drawing including cutting steel sections and welding the same to required pattern with a coat of red lead primer, cost of materials, fixtures, labour with all incidental charges with all lead, lift, machinery equipment etc. complete. As directed by Engineer in-charge.

13. Finishing with Epoxy paint (two or more coats)

Finishing with Epoxy paint (two or more coats) at all locations prepared and applied as per manufacturer's specifications including appropriate priming coat, preparation of surface, etc. complete. On steel work Thickness of 275 micron.

14. PROVIDING FIXING TURBO VENTILATORS

Providing fixing turbo ventilators with necessary fixing arrangements including cost of all materials, labour, HOM, lead & lift etc. complete as directed by Engineer.

15. PROVIDING AND CONSTRUCTING BURNT BRICH MASONRY

6.1. **Bricks / Brick tiles / Brick bats -** Bricks used in the masonry may be of the following type:

a) **Common burnt clay bricks -** Shall be hand moulded or machine moulded. They shall be free from nodules of free lime; visible cracks, flaws warpage and organic matter have a frog 100mm to 20 mm deep on one of its flat sides. Bricks made by extrusion process and brick tiles may not be marked with frogs. Each brick shall be marked (in the frog where provided) with the manufacturer's identification mark or initials.

b) **Fly ash lime brick -** Shall be sound, compact and uniform in shape free from visible cracks, war pages flaws and organic matter, have a frog 100 mm in length, 40mm width and 10 to 20 mm deep on one of its flat side. The shape and size of the frog shall conform to IS: 12894.

Fly Ash: Flay ash shall conform to grade I or Grade 2 of IS: 3812.

Bottom ash used as replacement of sand shall not have more than 12% loss on ignition when tested.

Sand: Deleterious materials, such as clay and silt in the sand shall preferably be less than 5%.

Lime: Lime shall conform to Class 'C'hydrated lime of IS: 712.

Additives: Any Suitable additive considered not detrimental to the durability of bricks may be used.

c) **Clay fly ash bricks -** The clay fly ash brick shall be sound, compact and uniform in shape and

colour. Bricks shall have smooth rectangular faces with sharp and square corners. The bricks shall be free from visible cracks, flaws, warpage, nodules of free lime and organic matter. The bricks shall be hand or machine moulded. The bricks shall have frog of 100 mm in length 40 mm width and 10 to 20 mm deep on one of its flat sides.

d**) Fly ash shall conform to grade I of II of IS: 3812**

Calcium silicate bricks - Calcium silicate bricks shall be sound, compact and uniform in shape –bricks shall be free from visible cracks, warpage organic matter, large pebbles and nodules of free lime. Bricks shall be solid and with or without frog. The bricks shall be made of finely grounded sand siliceous rock and lime. In addition limited quantity of fly ash conforming to IS: 3812 may be used in the mix.

e) **Tile brick** - The bricks of 4 cm height shall be moulded without frogs. Where modular tiles are not freely available in the market, the tile bricks of F.P.S. thickness 44mm (1-3/4") shall be used unless otherwise specified.

f) **Brick bats -** Brick bats shall be obtained from well burnt bricks.

6.1.1. **Dimensions -** The brick may be modular or non-modular. Size for both types of bricks/ tiles shall be as per Table 1. While use of modular brick tiles is recommended, non-modular (FPS) bricks/tiles can also be used where so specified. Non–modular bricks / tiles of sizes other than the sizes mentioned in Table 1 may also be used where specified.

Table 1

Type of Bricks / tiles	Nominal size mm	Actual size mm
Modular Bricks	200x100x100mm	190x90x90mm
Modular Tile Bricks	200x100x40mm	190x90x40mm
Non-Modular Tile Bricks	229x114x44mm	225x111x44mm
Non-Modular Bricks	229x114x70mm	225x111x70mm 225x112.5x65mm

6.1.2. **Classification -** Bricks / Brick tiles shall be classified on the basis of their minimum compressive strength as given below.

Table 2

Class Designation	Average compressive strength			
	Not less than		Less than	
	N / mm²	(kgf / cm²)	N / mm²	(kgf / cm²)
10(100)	10	(100)	12.5	125
7.5(75)	7.5	(75)	10	100
5(50)	5	(50)	7.5	75

3.5(35)	3.5	(35)	5.0	50

The bricks shall have smooth rectangular faces with sharp corner and shall be uniform in colour and emit clear ringing sound when struck.

(Note: Upper limits specified in Table 2 are for calculating the average compressive strength in accordance with Annexure 6-A.2.)

6.1.3. **Sampling and tests -** Sampling of bricks shall be subjected to the following tests
(a)Dimensional tolerance (b) Water absorption (c) Efflorescence (d) Compressive strength
6.1.3.1. **Sampling -** For carrying out compressive strength, water absorption, efflorescence and dimensional tests, the samples of bricks shall be taken at random according to the size of lot as given in table 3 below. The sample thus taken shall be stored in a dry place until tests are made. For the purpose of sampling the following definition shall apply.
a) **Lot** - A collection of same class and size, manufactured under relatively similar conditions of production. For the purpose of sampling a lot shall contain a maximum of 50,000 bricks
In case a consignment has bricks more than 50,000 of the same classification and size and manufactured under relatively similar conditions of production , it shall be divided into lots of 50,000 bricks or part there of.
(b) **Sample -** A collection of bricks selected for inspection and / or testing from a lot to reach the decision regarding the acceptance or rejection of the lot.
(c)**Defective -** A brick failing to meet one or more of the specified requirements.
6.1.3.2. The samples shall be taken as below:
(i) Sampling from a stack - When it is necessary to take a sample from a stack, the stack shall be divided into a number of real or imaginary sections and the required number of bricks drawn from each section. For this purpose bricks in the upper layers of the stack shall be removed to enable units to be sampled from places within the stack.
Note: For other methods of sampling i.e. sampling in motion and sampling from lorries or trucks, IS: 5454 may be referred. Scale of sampling and criteria for conformity for visual and dimensional characteristics: -
Visual characteristics - The bricks shall be selected and inspected for ascertaining their conformity to the requirements of the relevant specification.
The number of bricks to be selected from a lot shall depend on the size of lot and shall in accordance of col. 1 and 2 of Table 3 for visual characteristics in all case and dimensional characteristics if specified for individual bricks.
(ii) Visual characteristics - All the bricks selected above in accordance with col. 1 and 2 of Table 3 shall be examined for visual characteristics. If the number of defective bricks found in the sample is less than or equal to the corresponding number as specified in col.3 of table 3 the lot shall be considered as satisfying the requirements of visual characteristics, otherwise the lot shall be deemed as not having met the visual requirements.
(iii) Dimensional characteristics - The number of bricks to be selected for inspecting the dimensions and tolerance shall be in accordance with col.1. and 4 of Table 3. These bricks will be divided into groups of 20 bricks at random and each of 20 bricks thus formed will be tested for all the dimensions and tolerances. A lot shall be considered having found meeting the requirements of dimensions and tolerance, if none of the groups of bricks inspected fails to meet the specified requirements.
Table 3 Scale of sampling and permissible number of defectives for visual and dimensional

characteristics

No. of bricks in the lot	For characteristics specified for individual bricks		For dimensional characteristics for group of 20 bricks- No. of bricks to be selected
	No. of bricks to be selected	Permissible no of defectives in the sample	
2001-10000	20	1	40
10001-35000	32	2	60
35001-50000	50	3	80

Note: In case the lot contains 2000 or less bricks the sampling shall be as per decision of the engineer.

iv)**Scale of sampling and criteria for physical characteristics -** The lot which has been found satisfactory in respect of visual and dimensional requirements shall be next tested for physical characteristics like compressive strength water absorption, efflorescence as specified in relevant material specification. The bricks for this purpose shall be taken at random from those already selected above. The number of bricks to be selected for each of these characteristics shall be in accordance with relevant columns of Table 4.

Table 4

Lot Size	Sample size for compressive strength, water absorption and efflorescence	Permissible No. of defectives for efflorescence
2001-10000	5	0
10001-35000	10	0
35001-50000	15	1

Note: In case the lot contains 2000 or less bricks, the sampling shall be as per decision of engineer.

v) A lot shall be considered having satisfied the requirements of physical characteristics if the condition stipulated here in are all satisfied.

(a) From the test results for compressive strength the average shall be calculated and shall satisfy the requirements specified in relevant material specification.

Note: In case any of the test results for compressive strength exceeds the upper limit for the class of bricks, the same shall be limited to the upper limit of the class for the purpose of average

(b) Where specified in the material specification, the compressive strength of any individual bricks tested in the sample shall not fall below the minimum average compressive strength specified for the corresponding class of brick by more than 20 per cent. (c) From the test results for water absorption, the average for the bricks in the sample shall be calculated and shall satisfy the relevant requirements shall satisfy the relevant requirements specification in material specification. (d) The number of bricks failing to satisfy the requirements of the efflorescence specified in the relevant specification should not be more than the permissible no. of defectives given in col. 3 of Table 4.

6.1.3.3. **Dimensional tolerances -** The dimensions of modular bricks when tested as described above as per procedure described in Annexure 6-A.1 shall be within the following limits per 20 bricks.

Length 372 to 388 cm (380 ± 8 cm)

Width 176 to 184 cm (180 ± 4 cm)

Height 176 to 184 cm (180 ± 4 cm) for 90 cm high bricks

Brick tiles

76 to 84 cm (80 ± 4) for 40 mm high brick tiles. In case of non–modular bricks, %age tolerance will be ± 2% for group of 20 numbers of classes, 10 bricks and ± 4% for other class of bricks.

6.1.3.4. **Compressive strength -** The bricks when tested in accordance with the procedure laid down in Annexure 6-A.2 shall have a minimum average compressive strength for various classes as given in Table 2 the compressive strength of any individual brick tested shall not fall below the min average compressive strength specified for the corresponding class of brick by more than 20%. In case compressive strength of any individual brick tested exceeds the upper limit specified in Table 2 for the corresponding class of bricks, the same shall be limited to upper limit of the class as specified in Table 2 for the purpose of calculating the average compressive strength.

6.1.3.5. **Water absorption -** The average water absorption of bricks when tested in accordance with the procedure laid down in Annexure 6-A.3 shall be not more than 20% by weight.

6.1.3.6. **Efflorescence -** The rating of efflorescence of bricks when tested in accordance with the procedure laid in Annexure 6-A.4 shall be not more

6.2. **SPECIFICATIONS FOR BRICK WORK**

6.2.1. **Classification -** The brick work shall be classified according to the class designation of bricks used.

6.2.2. **Mortar -** The mortar for the brick work shall be as specified, and conform to accepted standards. Lime shall not be used where reinforcement is provided in brickwork.

6.2.3. **Soaking of bricks -** Bricks shall be soaked in water before use for a period for the water to just penetrate the whole depth of the bricks. Alternatively bricks may be adequately soaked in stacks by profusely spraying with clean water at regular intervals for a period not less than six hours. The bricks required for masonry work using mud mortar shall not be soaked. When the bricks are soaked they shall be removed from the tank sufficiently early so that at the time of laying they are skin-dry. Such soaked bricks shall be stacked on a clean place where they are not again spoiled by dirt earth etc.

Note: 1. The period of soaking be easily found at site by a field test in which the bricks are soaked in water for extent of water penetration. The least period that corresponds to complete soaking will be the one to be allowed for in construction work.

Note: 2. If the bricks are soaked for the required time in water that is frequently changed the soluble salt in the bricks will be leached out, and subsequently efflorescence will be reduced.

6.2.4. **Laying**

6.2.4.1. Bricks shall be laid in English bond (fig.2.3.) unless otherwise specified. For brick work in half brick wall, bricks shall be laid in stretcher bond. Half or cut bricks shall not be used except as closer where necessary to complete the bond. Closers in such cases shall be cut to the required size and used near the ends of the wall. Header bond shall be used preferably in all courses in curved plan for

ensuring better alignment.

Note: Header bond shall also be used in foundation footings unless thickness of walls (width of footing) makes the use of headers impracticable, where thickness of footing is uniform for a number of courses the top course of footing shall be headers.

6.2.4.2. All loose materials, dirt and set lumps of mortar which may be lying over the surface on which brick work is to be freshly started, shall be removed with a wire brush and surface wetted. Bricks shall be laid on a full bed of mortar when laying each brick shall, be properly bedded and set in position by gently pressing with the handle of a trowel. Its inside face shall be buttered with mortar before the next brick is laid and pressed against it. Joints shall be fully filled and packed with mortar such that no hollow spaces are left inside the joints.

6.2.4.3. The walls shall be taken up truly in plumb or true to the required batter where specified. All courses shall be laid truly horizontal and all vertical joints shall be truly vertical. Vertical joints in the alternate course shall come directly one over the other. Quoin, jambs and other angles shall be properly plumbed as the work proceeds. Care shall be taken to keep the propounds properly aligned within following maximum permissible tolerances:

(a) Deviation from vertical within a storey shall not exceed 6 mm per 3m height.

(b) Deviation in verticality in total height of any wall of building more than one storey in height shall not exceed 12.5. mm (c) Deviation from position shown on plan of any brickwork shall not exceed 12.5. mm (d) Relative displacement between load bearing wall in adjacent storey intended to be vertical alignments all not exceed 6 mm. (e) A set of tools comprising of wooden straight edge, masonic spirit levels, square, 1 meter rule line and plumb shall be kept on the site of work for every 3 masons for every 3 masons for proper check during the progress of work.

6.2.4.4. All quoins shall be accurately contracted and the height of brick courses shall be kept uniform. This will be checked using graduated wooden straight edge or storey rod indicating height of each course including thickness of joints. The position of damp proof course, windowsills, bottom of lintels top of the wall etc., along the height of the wall shall be marked on the graduated straight edge or storey rod. Acute and obtuse quoins shall be bonded, where practicable in the same way as square quoins. Obtuse quoins shall be formed with squint showing three quarters brick on one face and quarter brick on the other.

6.2.4.5. The brickwork shall be built in uniform layers. **No part of the wall during its construction shall rise more than one meter above the general construction level**. Parts of wall left at different levels shall be raked back at an angle of 45 degrees or less with the horizontal. Tooting shall not be permitted as an alternative to raking back. For half brick partition to be keyed into main walls, indents shall be left in the main walls.

6.2.4.6. All pipe fittings and specials, spouts hold fasts and other fixtures which are required to be built into the walls shall be embedded, as specified in their correct position as the work proceeds unless otherwise directed by the engineer.

6.2.4.7. Top courses of all plinths, parapets, steps and top of walls below floor and roof slabs shall be laid with brick on edge, unless specified otherwise. Brick on edge laid in the top courses at corner of walls shall be properly radiated and keyed into position to form cut corners as shown in Fig. 4.

Where bricks cannot be cut to the required shape to from cut corners, cement concrete 1:2:4(1 cement: 2 coarse sand: 4 graded stone aggregate 20 mm nominal size) equal to thickness of course shall be provided in lieu of cut bricks.

6.2.4.8. Bricks shall be laid with frog (where provided) up. However, when top course is exposed bricks shall be laid with frog down. For the bricks to be laid with frog down, the frog shall be filled with mortar before placing the brick in position.

6.2.4.9. In case of walls one brick thick and under one face shall be kept even and in proper plane, which the other face may be slightly rough. In case of walls more than one brick thick, both the faces shall be kept even and in proper plane.

6.2.4.10. To facilitate taking service lines later without excessive cutting of completed work, sleeves (to be paid separately) shall be provided, where specified, while raising the brick work. Such sleeves in external walls shall be sloped down outward so as to avoid passage of water inside.

6.2.4.11. Top of the brickwork in coping and sills in external walls shall be slightly tilted. Where brick coping and sills are projecting beyond the face of the wall drip course/ throating (to be paid separately) shall be provided where indicated.

6.2.4.12**.** Care shall be taken during construction that edges of jambs sills and projections are not damaged in case of rain. New built work shall be covered with gunny bags or tarpaulin so as to prevent the mortar from being washed away. Damage if any, shall be made good to the satisfaction of the engineer.

6.2.4.13. Vertical reinforcement in the form of bars (MS or high strength deformed bars) considered necessary at the corners and junction of walls and jamb opening doors, windows etc., shall be encased with cement mortar not leaner than 1:4 (1 Cement 4 coarse sand) or cement concrete mix as specified. The reinforcement shall be suitably tied, properly embedded in the foundation and at roof level. The Dai of bars shall not be less than 8 mm and concrete grade shall be minimum 1:3:6 (1 cement 3 coarse sand: 6 graded stone aggregate 20 mm nominal size).

6.2.4.14. In retaining walls and the like where water is likely to accumulate weep holes, 50 to 75 mm square shall be provided at 2 m vertically and horizontally unless otherwise specified. The lowest weep hole shall be at about 30 cm above the ground level. All weep helps shall be surrounded by loose stones and shall have sufficient fall to drain of the water quickly.

(Note: Work of providing loose stone will be payable extra).

6.2.4.15. Work of cutting chases, where required to be made in the walls for housing G.I pipe, CI pipe or any other fixtures shall be carried out in various locations as per guidelines given below:

(a) **Cutting of chases in one brick thick and above load bearing walls**

(i) As far as possible services should be planned with the help of vertical chases. Horizontal chases should be avoided. (ii) The depths of vertical chases and horizontal chases shall not exceed one third and one sixth of the thickness of the masonry respectively. (iii) When narrow stretches of masonry (or short length of walls) such as between doors and windows, cannot be avoided they should not be pierced with openings for soil or waste pipes or possibility of load concentration such narrow lengths of walls shall be checked for stresses and high strength bricks in mortar or concrete walls provided if required. (iv) Horizontal chases when unavoidable should be located in the upper or lower one third

or height of storey and not more than three chases should be permitted in any stretch of a wall No. continuous horizontal chase shall exceed one meter in length. Where unavoidable stresses in the affected area should be checked and kept within the permissible limits.(v) Vertical chases should not be closer than 2 m in any stretch of a wall. These shall be kept away from bearings of beams and lintels. If unavoidable stresses in the affected area should be checked and kept within permissible limits, (vi) Masonry directly above a recess, if wider than 30 cm horizontal dimension should be supported on lintel. Holes are masonry may be provided upto to cm width and 30 cm height without any lintel. In the case of circular holes in the masonry, no lintel need be provided for holes upto 40 cm in diameter.

(b) **Cutting of chases in half brick load bearing walls -**

No chase shall be permitted in half brick load bearing walls and as such no recessed conduits and concealed pipes shall be provided with half thick load bearing walls.

(c) **Cutting of chases in half brick non-load bearing wall -** Services should be planned with the help of vertical chases. Horizontal chase should be provided only when unavoidable.

6.2.5. **Joints -** The thickness of all types of joints including brick wall joints shall be such that four course and three joints taken consecutively shall measure as follows:

(i)In case of modular bricks conforming to IS: 1077 specification for common burnt clay buildings bricks, equal to 39 cm. (ii) In case of non–modular bricks, it shall be equal to 31 cm.

Note: Specified thickness of joints shall be of 1 cm. Deviation from the specified thickness of all joints shall not exceed one – fifth of specified thickness.

6.2.5.1. **Finishing of joints -** The face of brickwork be finished flush or by pointing. In flush finishing either the face joints of mortar shall be worked out while still green to give a finished surface flush with the face of the brick work or the joints shall be squarely raked out to a depth of 1 cm while the mortar is till green for subsequently plastering. The faces of brickwork shall be cleaned with wire brush so as to remove any splashes of mortar during the course of raising the brickwork. In pointing the joints shall be squarely raked out to a depth of 1.5 cm while the mortar is still green and raked joints shall be brushed to remove dust and loose particles and well wetted and shall be later refilled with mortar to give ruled finish some such finishes are "flush" " weathered" "ruled" etc.,

6.2.6. **Curing -** The brickwork shall be constantly kept moist on all faces for a minimum period of seven days. Brickwork done during the day shall be suitably marked indicating the date on which the work is done so as of keep a watch on the curing period.

6.2.7. **Scaffolding -** Scaffolding shall be strong to withstand all dead, live and impact loads, which are likely to come on them. Scaffolding shall be provided to allow easy approach to every part of the work.

6.2.7.1. **Single scaffolding -** Where plastering pointing or any finishing has been indicated for brickwork single scaffolding may be provided unless otherwise specified. In single scaffolding one end of the put –logs / pole shall rest in the hole provided in the header course of brick masonry. Not more than one header for each put – log / pole rest in the hole provided in the header course of brick masonry. Not more than one header for each put log / pole shall be left out. Such holes shall not be allowed in the case of pillars, brick work less than one metre in length between the openings or near the skewbacks of arches or immediately under or near the structural member supported by the walls.

The holes for putlogs / poles shall be made good with brickwork and wall finishing as specified.

6.2.7.2. **Double Scaffolding -** Where the brick work or tile work is to be exposed and not to be finished with plastering etc., double scaffolding having two independent supports clear of the work, shall be provided.

6.2.8. **Measurements**

6.2.8.1. Brickwork shall be measured in cubic meters unless otherwise specified. Any extra work over the specified dimensions shall be ignored. Dimensions shall be measured correct to the nearest 0.01-m i.e. 1 cm. Areas shall be calculated to the nearest 0.01 sq.mtrs and the cubic contents shall be worked out to the nearest 0.01 cubic meters.

6.2.8.2. **Brickwork shall be measured separately in the following stages**

(a) From foundation to floor one level (Plinth level)

(b) Plinth (floor one) level to floor two level

(c) Between two specified floor levels above floor two level

Note: (1) Brick work in parapet walls, mumty, lift machine room and water tanks constructed on the roof upto 1.2 m height above roof shall be measured together with the corresponding work of the floor next below.

6.2.8.3. No deductions or additions shall be done and no extra payment made for the following:

Note: Where minimum area is defined for deduction of an opening or void or both such areas shall refer only to opening or void the space measured.

a) Ends of dissimilar materials (that is, joints beams, lintels, posts, girders, rafters, purlins trusses, corbels, steps etc.,) up to 0.1 m^2 in section.

b) Opening up to 0.1.m^2 in area (see Note)

c) Wall plates, bed plates and bearing of slabs chejjas and the like, where thickness does not exceed 10 cm and bearing does not extend over the full thickness of wall:

d) Cement concrete blocks as for holdfasts and holding down bolts:

e) Iron fixtures such as wall ties pipes upto 300 mm diameter and hold fasts for doors and windows; and f) Chases of section not exceeding 50 cm in girth g) Bearing portion drip course bearing of moulding and cornice.

Note: In calculating area of an opening any separate lintel or sills shall be included with the size of the opening but end portions of lintel shall be excluded. Extra width of rebated reveals, if any shall also be excluded.

6.2.8.4. Walls half brick and less shall each be measured separately in square meters stating thickness.

6.2.8.5. Walls beyond half brick thickness shall be measured in multiples of half brick, which shall be deemed to be inclusive of mortar joints for the sizes of bricks specified in 6.1.1. half brick thickness shall mean 100 mm for modular and 115 mm for non – modular bricks.

Where fractions of half brick occur due to architectural or other reasons, measurement shall be as follows: a) upto 1/4th brick – actual measurements and b) exceeding ¼ brick- full half bricks.

6.2.8.6. String courses, projecting pilasters, aprons sills and other projections shall be fully described and measure separately in running meters stating dimensions of each projection.

6.2.8.7. Square or rectangular pillars shall be measured separately in cubic meters in multiple of half brick.

6.2.8.8. Circular pillars shall be measured separately in cubic meters as per actual dimensions.

6.2.8.9. Brick work curved on plan shall be measured like the brick in straight walls and shall include all cutting and wastage of bricks tapered, vertical joints and use of extra mortar, if any. Brick work curved on plan to a mean radius not exceeding six meters shall be measured separately and extra shall be payable over the rates for brick work in straight walls. Nothing extra shall be payable if the mean radius of the brickwork curved in plan exceeds six meters.

6.2.8.10. Tapered walls shall be measured net as walls and extra payment shall be allowed for making tapered surface for brickwork in walls.

6.2.8.11. Brick work with brick tiles shall be measured and paid for separately.

6.2.9. **Rate -** The rate shall include the cost of materials and labour required for all the operations described above except the vertical reinforcement and its encasement in cement mortar or cement concrete the rate shall also include the following:

a) Raking out joints or finishing joints flush as the work proceeds;

b) Preparing tops of existing walls and the like for raising further new brick work.

c) Rough cutting and waste for forming gables splays at eaves and the like.

d) Leaving holes for pipes upto 150 mm dia and encasing hold fasts etc.

e) Rough cutting and waste for brick work curved in plan and for backing to stone or other types of facing.

f) Embedding in ends of beams, joints slabs, lintels, sills, trusses etc.

g) Bedding wall plates lintels, sills, roof tiles corrugated sheets etc in or on walls if not covered in respective items and

h) Leaving chases of section not exceeding 50 cm in girth or 350 sq in cross-section.

I) Brick on edge courses, cut brick corners, splays reveal, cavity walls, brick works, curved on plan to a mean radius exceeding six meters.

16. PROVIDING AND LAYING IN POSITION PLAIN CEMENT CONCRETE

4.0 The concrete can be designed in grades denoting by volumetric proportion of the constituents' characteristic compressive strength. The concrete by volumetric proportion or nominal mix concrete of the constituents as well as **Design Mix** denoting compressive strength as detailed in this section.

4.1. **Materials.**

4.1.1 Water, cement, lime, fine aggregate or sand, surkhi, cinder and fly ash shall be as specified in Section 0.

4.1.2 **Coarse aggregate**

4.1.2.1. **General -** Aggregate most of which is retained on 4.75 mm IS Sieve and contains only as much

fine material as is permitted in IS 383 for various sizes and grading is known as coarse aggregate. Coarse aggregate shall be specified as stone aggregate, gravel or brick aggregate and it shall be obtained from approved / authorised sources

a) **Stone aggregate -**It shall consist of naturally occurring (uncrushed, crushed or broken) stones. It shall be hard, strong, dense, durable and clean. It shall be free from veins, adherent coating, and injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious substances. It shall be roughly cubical in shape. Flaky and elongated pieces shall be avoided. It shall conform to IS: 383 unless otherwise specified.

b) **Gravel -** It shall consists of naturally occurring (uncrushed, crushed or broken) river bed shingle or pit gravel. It shall be sound, hard and clean. It shall be free from flat particles of shale or similar laminated material, powdered clay, silt, and loam adherent coating, alkali vegetable, matter and other deleterious substances. Pit gravel shall be washed if it contains soil materials adhering to it. These shall soil materials soil materials adhering to it. These shall conform to IS: 383 unless otherwise specified.

c) **Brick aggregate -** Brick aggregate shall be obtained by breaking well burnt or over burnt dense bricks / brick bats. They shall be homogenous in texture, roughly cubical in shape and clean. They shall be free from unburnt clay particles. Soluble salt, silt, adherent coating of soil vegetable matter and other deleterious substances. Such aggregate should not contain more than one percent of sulphate and should not absorb more than 10% of their own mass of water, when used in cement concrete and 20% when used in lime concrete. It shall conform to IS: 383 unless otherwise specified.

d) Lightweight aggregates such as sintered fly ash aggregate may also be used provided the engineer is satisfied with the data on the proportion of concrete made with them.

4.1.2.2. **Deleterious material** - Course aggregate shall not contain any deleterious material, such as pyrites, coal, lignite, shale or similar laminates material, clay, alkali, soft fragments, sea shells and organic impurities in such quantity as to affect the strength or durability of the concrete. Coarse aggregate to be used for reinforced cement concrete shall not contain any material liable to the steel reinforcement. Aggregates which are chemically reactive with alkali of cement shall not be used. The maximum quantity of deleterious material shall not more than five per cent of the weight of coarse aggregate when determined in accordance with IS: 2386 part II.

4.1.2.3. **Size and grading**

(i) Stone aggregate and gravel - It shall be either graded or single sized as specified. Normal size and grading shall be as under --

(a) Nominal sizes of graded stone aggregate or gravel shall be 40, 20, 16, or 12.5 mm as specified. For any one of the nominal sizes, the proportion of other sizes shall be in accordance with Table 1.

Table 1 -Graded stone aggregate or gravel

IS Sieve Designation	Percentage passing (by weight) for nominal size of			
	40 mm	20 mm	16 mm	12.5 mm
75 mm	100	-	-	-
37.5 mm	95 to 100	100	-	-
19 mm	-	95 to 100	100	100
16 mm	-	-	90 to 100	-
11.2 mm	-	-	-	90 to 100
9.5 mm	10 to 35	25 to 55	30 to 70	40 to 85

4.75 mm	0 to 5	0 to 10	0 to 10	0 to 10
2.36 mm	-	-	-	-

Concrete work

(b). Normal sizes of single sized stone aggregate or gravel shall be 63, 40, 20, 16, 12.5 or 10 mm as specified. For any one of the nominal sizes the proportion of other sizes shall be in accordance with Table 2.

Table 2 -Single sized (ungraded) stone aggregate or gravel

IS Sieve Designation	Percentage passing (by weight) for nominal size of					
	63 mm	40 mm	20 mm	16 mm	12.5 mm	10 mm
75 mm	100	-	-	-	-	-
63 mm	85-100	100	-	-	-	-
37.5 mm	0-30	85-100	100	-	-	-
19 mm	0-5	-20	85-100	100	-	-
16 mm	-	-	-	-85-100	100	-
11.2 mm	-	-	-	-	85-100	100
9.5	-	0-5	0-20	0-30	0-45	85-
100						
4.75 mm	-	-	0-5	0-5	0-10	0-20
2.36 mm	-	-	-	-	-	0-5

c). When stone aggregate or gravel brought to site is single sized (ungraded), it shall be mixed with single sizes aggregate of different sizes in the proportion to be determined by field tests to obtain graded aggregate of specified nominal size. For the required nominal size, the proportion of other sizes in mixed aggregate shall be in accordance with Table 1. Recommended proportions by volume for mixing of different sizes of single size (ungraded) aggregate to obtain the required nominal size of graded aggregate are given in Table 3.

Table 3 -Single sized (ungraded) stone aggregate or gravel

Cement Concrete	Nominal size of graded aggregate required	Parts of single size aggregate of size				
		50 mm	40 mm	20 mm	12.5 mm	10 mm
1: 6:12	63	9	-	3	-	-
1: 6: 12	40	-	9	3	-	-
1: 5: 10	63	7 ½	-	2 ½	-	-
1: 5: 10	40	-	7 ½	2 ½	-	-
1: 4: 8	63	6	-	2	-	-
1: 4: 8	40	-	6	2	-	-
1: 3: 6	63	4 ½	-	1 ½	-	-
1: 3: 6	40	-	4 ½	1 ½	-	-
1: 3:6	20	-	-	4 ½	-	-
1: 2: 4	40	-	2 ½	1	-	½
1: 2: 4	20	-	-	3	-	1
1: 2: 4	12.5	-	-	-	3	-
1: 1 ½ : 3	20	-	-	2	-	1

Note-(i) The proportions indicated in Table 3 above are by volume when considered necessary, these proportions may be varied marginally by engineer after making sieve analysis of aggregate brought to site for obtaining required graded aggregate. No adjustments in rate shall be made for any variation in the proportions so ordered by the engineer. If single size coarse aggregates are not premixed at site to obtain the graded coarse aggregate required for mix, the volume of single size aggregates required for the mix shall be suitably increased to account for reduction in total volume at the site of mixing.

(ii) **Brick aggregate -** Nominal size of brick aggregate shall be40 mm and its grading shall be as specified in the Table 4 when tested for sieve.

Table 4 -Brick aggregate

IS Sieve Designation(by weight)	Percentage passing
75 mm	100
37.5 mm	95-100
19.0 mm	45-100
4.75	0-5

Note -Coarse aggregate for cement concrete shall generally conform to para 4.2.1 of IS: 456 and fine aggregate shall conform to IS: 383.

4.1.2.4. **Stacking -** Aggregate shall be stacked on a hard, dry and level patch of ground. When stack piling, the aggregate shall not form pyramids resulting in segregation of different sized materials. It shall be stacked separately according to nominal size of coarse aggregates. Stacking shall be done in regular stacks, of height not exceeding 100 cm.

4.1.2.5. **Testing -** Coarse aggregate shall be tested for the following (as per IS: 2386)

(a) Determination of particle size and shape
(b) Estimation of organic impurities (as per IS: 2386-Part II)
(c) Surface moisture
(d) Determination of 10% fine value

Measurements - The aggregates shall be measured in stacks and paid for after making a deduction of 7.5% of the gross measurements of stacks in respect of aggregates of nominal size 40 mm and above. No deduction from the gross measurements of the stacks is to be made in respect of aggregates nominal size below 40 mm.

4.1.2. **Admixtures -** When required, admixtures of approved quality shall be mixed with concrete, as specified. The admixtures shall conform to IS: 9103.

4.2. **SPECIFICATIONS FOR CEMENT CONCRETE**

4.2.0. This shall be prepared by mixing graded stone or brick aggregate of nominal size as specified with fine aggregate and cement in specified proportions with required quantity of water. The grading and quality of aggregates shall be such as to give minimum compressive strength of 140 kg/cm² and 210 kg / cm² at 7 days and 28 days respectively in case of mix 1:2:4, (One cement - two Coarse sand - four stone aggregate).

One sample consisting of 6 cubes 15x15x15 cm shall be taken for every 15 cubic meter or part thereof cement concrete 1:2:4. The cube tests shall not be carried out in case the quantity of cement concrete placed on any day is less than 15 cubic meter unless otherwise specific. For other details, refer section on R.C.C. work.

4.2.1. **Proportioning -** It shall be done by volume. Boxes of suitable size shall be used for measuring sand and aggregate. The internal dimensions of the boxes shall be generally 35 X 25 X40 cm deep or as otherwise approved by the engineer. The unit of measurement of cement shall be a bag

of 50 kg. and this shall be taken as 0.035 cubic meter. While measuring the aggregate, shaking, ramming or heaping shall not be done. The proportioning of sand shall be on the basis of its dry volume and in case of damp sand, allowances for bulk age shall be made as given for mortar.

4.2.2. **Preparation -** This shall be prepared by mixing coarse aggregate, fine aggregate and cement in specified proportions with required quantity of water. Nominal size and quality of aggregate shall be as specified.

Except where brick aggregate is used in cement concrete, minimum compressive strength on works test for different concrete mixes shall be as specified for various grades prepared by volume basis, in Table 5 below. The work test shall be carried out for every 15 cum of a day's concreting unless otherwise specified.

Table 5

Concrete mix	Min compressive strength on15 cm cube in Kg / cm²	
	7 days strength	28 days strength
1:1:2	210	315
1:1½ :3		265
1:2:4	140	175

4.2.2.1. **Mixing -** Concrete shall be mixed in mechanical batch type concrete mixers conforming to IS: 1791 having two blades and fitted with power loader (lifting hopper type). Half bag mixers and mixers without lifting hoppers shall not be used for mixing concrete. In exceptional circumstances, such as mechanical break down of mixer, work in remote areas or power breakdown and when the quantity of concrete work is very small, hand mixing may be done with the specific prior permission of the engineer in writing subject to adding 10% extra cement. When hand mixing is permitted, it shall be carried out on a watertight platform and care shall be taken to ensure that mixing is continued until the concrete is uniform in colour and consistency. Before mixing the brick aggregate shall be well soaked with water for a minimum period of two hours and stone aggregate or gravel shall be washed with water to remove, dirt, dust and other foreign materials. For guidance, the mixing time may be 1½ to 2 minutes, for hydrophobic cement it may be taken as 2½ to 3 minutes.

4.2.2.2. **Power loader -** Mixer will be fitted with a power loader complying with the following requirements.

a). The hopper shall be of adequate capacity to receive and discharge the maximum nominal batch of unmixed materials without spillage under normal operating conditions on a level site.

Note - In such a case the volume of the maximum nominal batch of mixed material is 50% greater than the nominal mixed batch capacity.

b). The minimum inside width of the feeding edge of the hopper shall be as specified below in Table 6.

Table 6

Nominal size of mixer (T, NT or R), litre	Minimum inside width of hopper feeding edge in mm
140	1.0
200	1.1
280	1.2
375	1.4
500	1.5

1000	2.0

C T = tilting; NT = non-tilting; R = Reverse

a) The design of the loader shall be such that it allows the loading hopper to be elevated to such a height that the center line of the chute plate of the hopper when in discharge position, is at an angle of not less than 50º to the horizontal. A mechanical device to aid discharge of the contents as quickly as possible from the hopper to the drum may also be provided. Even when a mechanical device is provided, it is recommended that the angle of center line of the chute plate of the hopper when in discharge position, should be as large as practicable, preferably not less than 40º to horizontal.

b) When the means of raising and lowering the loading hopper includes flexible wire ropes winding on to a drum or drums, the method of fastening the wire to rope to the drums shall be such as to avoid, as far as possible any tendency to cut the strands of the ropes and the fastening should preferably be positioned clear of the barrel of the drum for example, outside the drums flange. When the loading hopper is lowered to its normal loading position, there should be at least one and half drums of rope on the drum.

c) Clutch brake and hydraulic control lever shall be designed so as to prevent displacement by liberation or by accidental contact with any person.

d) The clutch and brake control arrangements shall also be so designed that the operator can control the falling speed of the loader.

e) Safety device shall be provided to secure the hopper in raised position when not in use

4.2.2.3**. Mixing efficiency -** The mixer shall be tested under normal working conditions in accordance with the method specified in IS - 4643 with a view to check its ability to mix the ingredients to obtain concrete having uniformity within the prescribed limits. The uniformity of mixed concrete shall be evaluated by finding the percentage variation in quantity (mass in water) of cement, fine aggregate and coarse aggregate in a freshly mixed batch of concrete.

The percentage variation between the quantities of cement, fine aggregate and coarse aggregates (as found by weighing in water) in the two halves of a batch and average of the two halves of the batch shall not be more than the following limits -

Cement	8%
Fine aggregate	6%
Coarse aggregate	5%

4.2.2.4. **Machine mixing -** The mixer drum shall be flushed clean with water. Measured quantity of coarse aggregate shall be placed first in the hopper. This shall be followed with measured quantity of fine aggregate and then cement. In case fine aggregate is damp, half the required quantity of coarse aggregate shall be placed in the hopper, followed by fine aggregate and cement. Finally the balance quantity of coarse aggregate shall be fed in the hopper, & then the dry materials are slipped into the drum by raising the hopper. The dry material shall be mixed for at least four turns of the drum. While the drum is rotating, water shall be added gradually to achieve the water cement ratio as specified or as required by the engineer. After adding water, the mixing shall be continued until concrete of uniform colour, uniformly distributed material and consistency is obtained. Mixing shall be done for at least two minutes after adding water. If there is segregation after unloading from the mixer, the concrete should be remixed. The drum shall be emptied before recharging. When the mixer is closed down for the day or at any time exceeding 20 minutes, the drum shall be flushed clean with water.

4.2.2.5 **Hand mixing -** When hand mixing has been specifically permitted in exceptional circumstances

by the engineer in writing, subject to adding 10% extra cement, it shall be carried out on a smooth, clean and water tight platform of suitable size. Measured quantity of sand shall be spread evenly on the platform and the cement shall be dumped on the sand and distributed evenly. Sand and cement shall be mixed intimately with spade until mixture is of even colour throughout. Measured quantity of coarse aggregate shall be spread on top of cement sand mixture and mixing done by shoveling and turning till the coarse aggregate gets evenly distributed in the cement sand mixture. Three quarter of the total quantity of water required shall be added in a hollow made in the middle of the mixed pile and the material is turned towards the middle of pile with spade. The whole mixture it turned slowly over and again and the remaining quantity of water is added gradually. The mixing shall be continued until concrete of uniform colour and consistency is obtained. The mixing platform shall be washed and cleaned at the end of the day.

4.2.3. **Workability -** The quantity of water to be used for each mix shall be such that the concrete is of adequate workability for the placing conditions of the concrete and can properly be compacted with the means specified. Generally, the quantity of water to be used for each mix of 50 Kgs cement shall not be more than 34 litres for 1:3:6 mix, 30 litres for 1:2:4 mix, 30 litres for 1:1½:3 mix and 25 litres for 1:1:2 mix. In case of vibrated concrete, the quantity of water may be suitably reduced to avoid segregation. The quantity of water shall be regulated by carrying out regular slump tests as described in Annexure 4.A.1. The slump and workability for different kind of works shall be as per Table 7 below

Table 7

Placing conditions.	Degree of workability	Value of workability
Concreting of shallow Sections with vibration	Very low	0.75-0.80 Compacting factor.
Concreting of lightly reinforced section with vibration.	Low	Slump up to 25 mm, 10-5 Seconds, vee bee time 0.8-0.85 compacting factor.
Concreting of lightly reinforced Section without vibration or heavily reinforced sections with vibration.	Medium	25-75 mm, slump for 20 mm aggregate.
Concreting of heavily reinforced sections without vibration.	High	75-125 mm slump for 20 mm aggregate.

Note - Where considered necessary, the workability of the concrete my also be ascertained by compacting factor test and vee-bee censistometer method as specified in IS: 1199. For suggested ranges of value of workability of concrete by the above methods, reference may be made to IS: 456-2000.

4.2.4. **Transportation -** Concrete shall be transported from the mixer to the place of laying as rapidly as possible by methods which will prevent the segregation or loss of any of the ingredients and maintaining the required workability.

4.2.5. **Placing -** The concrete shall be deposited as nearly as practicable in its final position to avoid rehandling. It shall be laid gently (not thrown) and shall be thoroughly vibrated and compacted before setting commences and should not be subsequently disturbed. Method of placing shall be such as to preclude segregation. Care shall be taken to avoid displacement of reinforcement or movement of form work and damage due to rains.

4.2.6. **Compaction -** Concrete shall be thoroughly compacted and fully worked around embedded fixtures and into corners of the form work. Compaction shall be done by mechanical vibrator of

appropriate type till a dense concrete is obtained. The mechanical vibrators shall conform to IS: 2505 specifications for concrete vibrators (immersion type). To prevent segregation, over vibration shall be avoided. The use of mechanical vibrator may be relaxed by the engineer at his discretion for certain items and permit hand compaction. Hand compaction shall be done with the help of tamping rods. Compaction shall be completed before the initial setting starts. For the items where mechanical vibrators are not to be used, the contractor shall take permission of the engineer in writing before the start of the work. After compaction the top surface shall be finished even and smooth with wooden trowel before the concrete begins to set.

4.2.7. **Construction joints -** Connecting shall be carried out continuously up to construction joints. The position and arrangement of construction joints shall be as shown in the structural drawings or as directed by the engineer. Number of such joints shall be kept minimum and shall be kept as straight as possible.

4.2.7.1. When the work has to be resumed on a surface which has hardened, such surface shall be roughened. It shall then be swept clean and thoroughly wetted. For vertical joints, neat cement slurry, of workable consistency by using 2kgs of cement per sq m shall be applied on the surface before it is dry. For horizontal joints, the surface shall be covered with a layer of mortar about 10-15 mm thick composed of cement and sand in the same ratio as the cement and sand in concrete mix. This layer of cement slurry of mortar shall be freshly mixed and applied immediately before placing of the concrete

4.2.7.2. Where the concrete has not fully hardened, all laitance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgement of particles of coarse aggregate. The surface shall be thoroughly wetted and all free water removed. The surface shall then be coated with neat cement slurry @ 2 kgs of cement per sqm. On this surface, a layer of concrete not exceeding 150 mm in thickness shall first be placed and shall be well rammed against corners and close spots; work, thereafter, shall proceed in the normal way.

4.2.8**. Concreting under special conditions**

4.2.8.1 **Work in extreme weather conditions** - During hot and cold weather, the concreting shall be done as per the procedure set out in IS: 7861(Part-I) and IS: 7861(Part II) respectively. Concreting shall not be done when the temperature falls below 4.5º C. In cold weather, the concrete placed shall be protected against frost. During hot weather, it shall be ensured that the temperature of wet concrete does not exceed 38ºC.

4.2.8.2 **Under water concreting -** Concrete shall not be deposited under water if it is practicable to de-water the area and place concrete in the regular manner. The concrete shall contain at least 10% more cement than that required for the same mix placed in dry conditions, the quantity of extra cement varying with conditions of placing with prior written permission of the engineer. Such extra cement will be paid extra. The volume of coarse aggregate shall not be less than 1½ times nor more than twice the fine aggregate and slump not less than 100 mm nor more than 180 mm. Where found necessary to deposit any concrete under water, the method, equipment, materials and mix shall first be got approved by the engineer. Concrete shall be deposited continuously until it is brought to required height. While depositing, the top surface shall be kept as nearly level as possible and the formation of heaps shall be avoided. The concrete shall be deposited under water by one of the approved methods such as Tremie method, drop bottom bucket, bags, grouting etc. as per details given in IS: 456-2000. If it is necessary to raise the water after placing the concrete, the level shall be brought up slowly without creating any waves or commotion tending to wash away cement or to disturb the fresh concrete in any way

4.2.9**. Curing -** When the concrete begins to harden i.e. two to three hours after compaction, the exposed surfaces shall be kept damp with moist gunny bags, sand or any other material approved by the engineer 24 hours after compaction, the exposed surface shall be kept continuously in damp or wet conditions by ponding or by covering with a layer of sacking, canvass, Hessian or similar absorbent materials and kept constantly wet for at least 7 days where ordinary Portland cement is used and 10 days, where Portland pozzolana cement is used from the date of placing of concrete. For concrete work with other types of cement, curing period shall be as directed by the engineer.

Approved curing compounds may be used in lieu of moist curing with the permission of the engineer. Such compounds shall be applied to all exposed surfaces of the concrete as soon as possible after the concrete has set

4.2.9.**1 Freshly laid concrete** shall be protected from rain by suitable covering.

4.2.9.2 **Over the foundation concrete**, the masonry work may be started after 48 hours of its compaction but the curing of exposed surfaces of cement concrete shall be continued along with the masonry work for at least 7 days. And where cement concrete is used as base concrete for flooring, the flooring may be commenced before the curing of period of base concrete is over but the curing of base concrete shall be continued along with top layer of flooring for a minimum period of 7 days.

4.2.10. **Testing of concrete** will be done as described in section on R.C.C

4.2.11**. Form work -** Form work shall be as specified in R.C.C section and shall be paid for separately unless otherwise specified.

4.2.12**. Finishes -** Plastering and special finishes other than those, obtained through form work shall be specified and paid for separately unless otherwise specified.

4.2.13. **Measurements**

4.2.13.1. Dimensions of length, breadth and thickness shall be measured correct to nearest cm. Except for the thickness of slab and partition which shall be measured to nearest 5 mm. Area shall be worked out to nearest 0.01 square meter and the cubic contents of consolidated concrete shall be worked out nearest 0.001 cubic meters. Any work done in excess over the specified dimension or as required by engineer is ignored.

4.2.13.2. **Concrete work executed** in the following conditions shall be measured separately

a. At or near the ground level
b. Work in liquid mud
c. Work in or under foul positions

4.2.13.3. Cast-in-situ concrete and or precast concrete work shall be measured in stages described in the item of work, such as -

a. At or near the ground level
b. Up to specified floor level
c. Between two specified floor levels
d. Up to specified height above or depth below plinth level / defined datum level
e. Between two specified heights or depths with reference to plinth level / defined datum level

4.2.13.4. **No deduction shall be made for the following -**

a. Ends of dissimilar materials for example beams, girders, rafters, purlins trusses corbels and steps up to 500sq. cm in cross sections.
b. Opening up to 0.1sq meter (1000sq.cm).
c. Volume occupied by pipes, conduits, sheathing etc. not exceeding 100sq cm each in cross sectional areas.

d. Small voids such as shaded portions in Figure when these do not exceed 40sq cm each in cross section.

Note - In calculating area of opening, the thickness of any separate lintel or still shall be included in the height. Nothing extra shall be payable for forming such openings or voids.

4.2.13.5. **Cast-in-situ concrete** shall be classified and measured as follows -

a) Foundation, footings, bases for columns
b) Walls (any thickness) including attached pilasters, buttresses, plinth and string courses, fillets etc.
c) Shelves
d) Slabs
e) Chajjas including portions bearing on the wall
f) Lintels, beams and Bressemmers
g) Columns, piers abutments, pillars, post and struts
h) Stair case including stringer beams but excluding landings.
i) Balustrades, newels and sailing
j) Spiral staircase (including landing)
k) Arches
l) Domes, vaults
m) Shell roof, arch ribs and folded plates
n) Chimneys and shaft.
o) Breast walls, retaining, walls, return walls
p) Concrete filling to precast components
q) Kerbs, steps and the like
r) String or lacing courses, parapets, copings, bed block, anchor blocks, plain window sills and the like
s) Cornices and moulded windows sills.
t) Louvers, fins, fascia.

4.2.13.6. **Precast cement concrete** solid articles shall be measured separately and shall include muse of moulds, finishing the top surfaces even and smooth with wooden trowel, before setting in position in cement mortar 1:2 (1 cement -2 coarse sand). Plain and moulded work shall be measured separately and the work shall be classified and measured as under -

Classification	Method of measurement
a. Wall panels	In square meters stating the thickness
b. String or lacing courses, coping, bed plats, plain windows sills, shelves, louvers, steps etc.	In cubic meters
c. Kerbs, edgings etc. In cubic meters	In cubic meters
d. Solid block work	In square meters stating the thickness or in cubic meters.
e. Hollow block work	In square meters stating the thickness or in cubic meters.
f. Light weight Partitions	In square meters stating the thickness or in cubic meters.

4.2.14. **Rate -** The rate is inclusive of the cost of labour and materials involved in all the operations described above.

17. SPECIFICATIONS FOR 12 MM LIME PLASTER

15.1.1. Scaffolding - For all exposed brick work or tile work, double scaffolding independent of the work having two sets of vertical supports shall be provided. The supports shall be sound and strong, tied together with horizontal pieces over which scaffolding planks shall be fixed.

For all other brick work in buildings, single scaffolding shall be permitted. In such cases the inner end of the horizontal scaffolding pole shall rest in a hole provided only in the header course for the purpose. Only one header for each pole shall be left out. Such holes for scaffolding shall, however, not be allowed in pillars/columns less than one meter in width or immediately near the skew backs of arches. The holes left in masonry works for scaffolding purposes shall be filled and made good before plastering.

Note - In case of special type of brick work, scaffolding shall be got approved from engineer in advance.

15.1.2. Preparation of Surface - The joints shall be raked out properly. Dust and loose mortar shall be brushed out. Efflorescence if any shall be removed by brushing and scrapping. The surface shall then be thoroughly washed with water, cleaned and kept wet before plastering is commenced.

In case of concrete surface if a chemical retarder has been applied to the form work, the surface shall be roughened by wire brushing and all the resulting dust and loose particles cleaned off and care shall be taken that none of the retarders is left on the surface.

15.1.3. Mortar - The mortar of the specified mix shall be used. Lime mortar shall be as specified.

15.1.4. Application of Plaster

15.1.4.1. Ceiling plaster shall be completed before commencement of wall plaster.

15.1.4.2. Plastering shall be started from the top and worked down towards the floor. All put-log holes shall be properly filled in advance of the plastering as the scaffolding is being taken down. To ensure even thickness and a true surface, plaster about 15 x 15 cm shall be first applied, horizontally and vertically, at nor more than 2 meters intervals over the entire surface to serve as gauges. The surfaces of these gauged areas shall be truly in the plane of the finished plaster surface. The mortar shall then be laid on the wall, between the gauges with trowel. The mortar shall be applied in a uniform surface slightly more than the specified thickness. This shall be beaten with thin strips of bamboo about one meter long to ensure through filling of the joints, and then brought to a true surface, by working a wooden straight edge reaching across the gauges, with small upward and side ways movements at a time. Finally the surface shall be finished off true with trowel or wooden float according as a smooth or a sandy granular texture is required. Excessive toweling or over working the float shall be avoided. During this process, a solution of lime putty shall be applied on the surface to make the later workable.

15.1.4.3. All corners, arises, angles and junctions shall be truly vertical or horizontal as the case may be and shall be carefully finished. Rounding or chamfering corners, arises, provision of grooves at junctions etc. where required shall be done without any extra payment. Such rounding, chamfering or grooving shall be carried out with proper templates or battens to the sizes required.

15.1.4.4. When suspending work at the end of the day, the plaster shall be left, cut clean to line both horizontally and vertically. When recommencing the plastering, the edge of the old work shall be scrapped cleaned and wetted with lime putty before plaster is applied to the adjacent areas, to enable the two to properly joint together. Plastering work shall be closed at the end of the day on the body of wall and not nearer than 15 cm to any corners or arises. It shall not be closed on the body of the features such as plasters, bands and cornices, nor at the corners of arises. Horizontal joints in plaster

work shall not also occur on parapet tops and copings at these invariably lead to leakages.

No portion of the surface shall be left out initially to be patched up later on.

15.1.5. Finish - The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds.

15.1.6. Thickness - The thickness of the plaster specified shall be measured exclusive of the thickness of key i.e., grooves or open joints in brick work. The average thickness of plaster shall not be less than the specified thickness, here 12 mm. The minimum thickness over any portion of the surface shall not be less than specified thickness by more than 3 mm. The average thickness should be regulated at the time of plastering by keeping suitable thickness of the gauges. Extra thickness required in dubbing behind rounding of corners at junctions of wall or in plastering of masonry cornices etc. will be ignored.

15.1.7. Curing - Curing shall be started 24 hours after finishing the plaster. The plaster shall be kept wet for a period of seven days. During this period, it shall be suitably protected from all damages at the contractor's expense by such means as the engineer may approve. The dates on which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched.

15.1.8. Precaution - Any cracks which appear in the surface and all portions which sound hollow when lapped, or are found to be soft or otherwise defective, shall be cut out in rectangular shape and redone as directed by the engineer.

i) When ceiling plaster is done, it shall be finished to chamfered edge at an angle at its junction with a suitably tool when plaster is being done. Similarly when the wall plaster is being done, it shall be kept separate from the ceiling plaster by a thin straight groove not deeper than 6 mm drawn with any suitable method with the wall while the plaster is green.

ii) To prevent surface cracks appearing between junctions of column / beam and walls, 150 mm wide chicken wire mesh should be fixed with U nails 150 mm centre to centre before plastering the junction. The plastering of walls and beam/column in one vertical plane should be carried out in one go. For providing and fixing chicken wire mesh with U nails payment shall be made separately.

15.1.9. Measurements

15.1.9.1. Length and breadth shall be measured correct to a cm and its area shall be calculated in square meters correct to two places of decimal.

15.1.9.2. Thickness of the plaster shall be exclusive of the thickness of the key i.e., grooves, or open joints in brick work.

15.1.9.3 The measurement of wall plaster shall be taken between the walls or partitions (the dimensions before the plaster shall be taken) for the length and from the top of the floor or skirting to the ceiling for the height. Depth of coves or cornices if any shall be deducted.

15.1.9.4. The following shall be measured separately from wall plaster.

a) Plaster bands 30 cm wide and under

b) Cornice beadings and architraves or architraves moulded wholly in plaster.

c) Circular work not exceeding 6 m in radius.

15.1.9.5. Plaster over masonry plasters will be measured and paid for as plaster only.

15.1.9.6. A coefficient of 1.63 shall be adopted for the measurement of one side plastering on honey comb work having 6 x 10 cm. opening.

15.1.9.7. Moulded cornices and coves

a) Length shall be measured at the centre of the girth.

b) Moulded cornices and coves shall be given in square meters the area being arrived at by multiplying length by the girth.

c) Flat or weathered top to cornices when exceeding 15 cm in width shall not be included in the girth but measured with the general plaster work.

d) Cornices which are curved in their length shall be measured separately.

15.1.9.8. Exterior plastering at a height greater than 10 m from average ground level shall be measured separately in each storey height. Patch plastering (in repairs) shall be measured as

plastering new work, where the patch exceed 2.5 sqm extra payment being made for preparing old wall, such as dismantling old plaster, raking out the joints and cleaning the surface. Where the patch does not exceed 2.5 sqm in area it shall be measured under the appropriate item under sub head 'Repairs to Buildings'.

15.1.9.9. Deductions in measurements, for opening etc. will be regulated as follows

a) No deduction will be made for openings or ends of joists, beams, posts, girders, steps etc. up to 0.5 sqm in area and no additions shall be made either, for the jambs, soffits and sills of such openings. The above procedure will apply to both faces of wall.

b) Deduction for opening exceeding 0.5 sqm but not exceeding 3 sqm each shall be made for reveals, jambs, soffits sills, sills, etc. of these openings.

1) When both faces of walls are plastered with same plaster, deductions shall be made for one face only.

2) When two faces of walls are plastered with different types of plaster or if one face is plastered and other is pointed or one face is plastered and other is unplastered, deduction shall be made from the plaster or pointing on the side of the frame for the doors, windows etc. on which width of reveals is less than that on the other side but on deduction shall be made on the other side.

Where width of reveals on both faces of wall is equal, deduction of 50% of area of opening on each face shall be made from area of plaster and / or pointing as the case may be.

3) For opening having door frame equal to or projecting beyond thickness of wall, full deduction for opening shall be made from each plastered face of wall.

Note - Different qualities of plastering referred in this para shall not include '18 mm plastering with terrazzo finish' as given in para 15.13 as the method of measurement in the case of the later is different. In such cases where the plaster on the other face consists of a plaster with terrazzo finish method of addition and deductions for the ordinary plaster face shall be regulated as if that face alone is plastered and the other is given an entirely different type of non-comparable treatment.

c) For opening exceeding 3 sqm in area, deduction will be made in the measurements for the full opening of the wall treatment on both faces, while at the same time, jambs, sills and soffits will be measured for payment.

In measuring jambs, sills and soffits, deduction shall not be made for the area in contact with the frame of doors, windows etc.

15.1.10. Rate - The rate shall include the cost of all labour and materials involved in all the operations described above.

SPECIFICATIONS CEMENT PLASTERING

15 mm thick lime plaster shall be done on rough side of single or half brick work. The average thickness of plaster shall not be less than 15 mm and the minimum thickness of the plaster at any

place shall not be less than 10 mm. All other details shall be as specified in 15.1.

15.3. SPECIFICATIONS FOR 18 MM LIME PLASTER (TWO COATS WORK)

15.3.1. The details of scaffolding and preparation of surface and mortar shall be as specified in 15.1.

15.3.2. Application of Plaster - The plaster shall be applied in two coats. I.e., 12 mm under coat and then 6 mm finishing coat and shall have an average final thickness of not less than 18 mm.

15.3.2.2. 12 mm under coat - This shall be applied in the same manner as specified under 12 mm lime plaster except that (a) the finishing after the mortar has been brought to a level with the wooden straight edge, shall be done with wooden float only (b) during the process lime putty solution shall not be applied.

The surface shall be further roughened by furrowing about 2 mm deep with a scratching tool diagonally both ways to form a key for the finishing coat. The scratched lines shall be at not more than 15 cm apart. The surface shall be kept wet till the finishing coat is applied.

15.3.2.3. 6 mm Finishing Coat - The finishing coat shall be applied a day or two after the under coat has set. The latter shall not be allowed to dry out, before the finishing coat is laid on. The finishing coat shall be applied in a uniform thickness of slightly more than 6 mm. The method of application shall be as described except that the surface shall not be beaten with bamboo strips. The final thickness of the top coat shall be 6 mm.

15.3.3. Thickness - The thickness of the under coat of plaster specified shall be exclusive of the thickness of key. The average thickness of the under coat shall not be less than 12 mm whether the wall treated is of brick or stone. In the case of brick work the minimum thickness over any portion of the surface shall not be less than 10 mm while in the case of stone work, the minimum thickness over the bushing shall not be less than 6 mm.

15.3.4. 26 mm finishing coat shall be uniformly 6 mm thick over the under coat in the case of both brick and stone masonry.

15.3.5. Specifications for other details such as Finish, Curing, Precautions, Measurements, and Rate etc. shall be as described.

15.5. SPECIFICATIONS FOR CEMENT PLASTERING

15.5.0. The cement plaster shall be 12 mm, 15 mm or 20 mm thick as specified in the item.

15.5.1. Scaffolding and preparation of surface shall be as specified in 15.1

15.5.2 Mortar - The mortar of the specified mix using the type of sand described in the item shall be used. It shall be as specified. For external work and under coat work, the fine aggregate shall conform to grading IV. For finishing cost work the fine aggregate conforming to grading zone V shall be used.

15.5.3. Application - The specifications as in 15.1.4 shall apply except in the following respects -

a) Beating with thin bamboo strips shall not be done on the cement plaster, and

b) No lime putty solution shall be applied on the face when finishing. Further the plastering and finishing shall be completed within half an hour of adding water to the dry mortar.

15.5.4. Thickness - Where the thickness required as per description of the item is 20 mm the average thickness of the plaster shall not be less than 20 mm whether the wall treated is of brick or stone. In the case of brick work, the minimum thickness over any portion of the surface shall be not less than 15 mm while in case of stone work the minimum thickness over the bushings shall be not less than 12 mm.

15.5.5. Curing - Curing shall be started as soon as the plaster has hardened sufficiently not to be damaged when watered.

The plaster shall be kept wet for a period of at least 7 days. During this period, it shall be suitably protected from all damages at the contractor's expense by such means as the engineer may approve. The dates on which the plastering is done shall be legibly marked on the various sections plastered so that curing for the specified period thereafter can be watched.

Specifications for Finish, Precautions, Measurements and Rate shall be as described in 15.1

15.6. SPECIFICATIONS FOR CEMENT PLASTER WITH A FLOATING COAT OF NEAT CEMENT

15.6.0. The cement plaster shall be 12, 15 or 20 mm thick, finished with a floating coat of neat cement, as described in the item.

15.6.1. Specifications for this item of work shall be same as described except for the additional floating coat which shall be carried out as below.

When the plaster has been brought to a true surface with the wooden straight edge (clause 13.5.3 It shall be uniformly treated over its entire area with a paste of neat cement and rubbed smooth, so that the whole surface is covered with neat cement coating. The quantity of cement applied for floating coat shall be 1 kg per sqm. Smooth finishing shall be completed with trowel immediately and in no case later than half an hour of adding water to the plaster mix. The rest of the specifications as described in 15.5.3 shall apply.

15.7. SPECIFICATIONS FOR 18 MM CEMENT PLASTER (TWO COAT WORK)

15.7.1. The specification for scaffolding and preparation of surface shall be as described in 15.5

15.7.2. Mortar - The mix and type of fine aggregate specified in the description of the item shall be used for the respective coats. It shall be as specified in section 0.5. Generally the mix of the finishing coat shall not be richer than the under coat unless otherwise described in item.

Generally coarse sand shall be used for the under coat and fine sand for the finishing coat, unless otherwise specified for external work and under coat work, the fine aggregate shall conform to grading zone IV. For finishing coat work the fine aggregate conforming to grading zone V shall be used.

15.7.3. Application

15.7.3.1. The plaster shall be applied in two coats i.e. 12 mm under coat and then 6 mm finishing coat and shall have an average total thickness of not less than 18 mm.

15.7.3.2. 12 mm under coat -This shall be applied as specified except that when the plaster has been brought to a true surface a wooden straight edge and the surface shall be left rough and furrowed 2 mm deep with a scratching tool diagonally both ways, to form key for the finishing coat is applied.

15.7.3.3. 6 mm finishing coat - The finishing coat shall be applied after the under coat has sufficiently set but not dried and in any case within 48 hours and finished in the manner as specified.

15.7.4. Specifications for Curing, Finishing, Precautions, Measurements and Rate shall be as described in 15.5

15.8. SPECIFICATIONS FOR 6 MM CEMENT PLASTER ON CEMENT CONCRETE AND REINFORCED CEMENT CONCRETE WORK

15.8.0 Scaffolding - Stage scaffolding shall be provided for the work. This shall be independent of the walls.

15.8.1. Preparation of Surface - Projecting burrs of mortar formed due to the gaps at joints in shuttering shall be removed. The surface shall be scrubbed clean with wire brushes. In addition concrete surface to be plastered shall be pock marked with a pointed tool, at spacing of not more than 5 cm centers, the pock being made not less than 3 mm deep. This is to ensure a proper key for the plaster. The mortar shall be washed off and surface, cleaned of all oil, grease etc. and well wetted

before the plaster is applied.

15.8.2. Mortars - Mortar of the specified mix using the types of sand described in the item shall be used. It shall be as specified.

15.8.3. Application -To ensure even thickness and a true surface, gauges of plaster 15 x 15 cm, shall be first applied at not more than 1.5 m intervals in both directions to serve as guides for the plastering. Surface of these gauged areas shall be truly in the plane of the finished plaster surface. The plaster shall be then applied in a uniform surface to a thickness slightly more than the specified thickness and shall then be brought to true and even surface by working a wooden straight edge reaching across the gauges. Finally the surface shall be finished true with a trowel or with wooden float to give a smooth or sandy granular texture as required. Excess trowel ling or over working of the floats shall be avoided. The plastering and finishing shall be completed within half an hour of adding water to the dry mortar.

15.8.4. Plastering of ceiling shall not be commenced until the slab above has been finished and centering has been removed. In case of ceiling of roof slabs, plaster shall not be commenced until the terrace work has been completed. These precautions are necessary in order that the ceiling plaster is not disturbed by the vibrations set up in the above operations.

15.8.5. Finish - The plaster shall be finished to a true and plumb surface and to the proper degree of smoothness as required. The work shall be tested 15.8.5 frequently as the work proceeds with a true straight edge not less than 2.5 m long and with plumb bobs. All horizontal lines and surfaces shall be tested with a level and all jambs and corners with a plumb bob as the work proceeds.

15.8.6. Thickness - The average thickness of plaster shall not be less than 6 mm. The minimum thickness over any portion of the surface shall not be less than 5 mm.

15.8.7. Curing - The specifications shall be as detailed in 15.5

15.8.8. Precautions - These shall be as described in 15.1.8.

15.8.9. Measurements

15.8.9.1. Length and breadth shall be measured correct to a cm. and its area shall be calculated in sq.m correct to two places of decimal. Dimensions before plastering shall be taken.

15.8.9.2. Thickness of plaster shall be exclusive of the thickness of the key i.e., depth or rock marks and hacking.

15.8.9.3. Plastering on ceiling at height greater than 5 m above the corresponding floor level shall be so described and shall be measured separately stating the height in stages of 1 m or part thereof.

15.8.9.4. Plastering on the sides and soffits of the projected beams of ceiling at a height greater than 5 m above the corresponding floor level shall be measured and added to the quantity as measured under 15.8.9.3.

15.8.9.5. Plastering on spherical and groined ceiling and circular work not exceeding 6 m in radius, shall be measured and paid for separately.

15.8.9.6. Flowing soffits (Viz. portion under spiral stair case etc.) shall be measured and paid for separately.

15.8.9.7. Ribs and mouldings on ceiling shall be measured as for cornices; deductions being made from the plastering on ceiling in case the width of the moulding exceed 15 cm.

15.8.9.8. The mode of measurement of exterior plaster and patch plastering (in repairs) shall be as laid down in 15.1.9.8

15.8.9.9. Deduction shall not be made for openings or for ends of columns, or columns caps of 0.5 sqm each in area and under. No additions will be made either for the plastering of the sides of such

openings. For openings etc. of areas exceeding 0.5 sqm deduction will be made for the full opening but the sides of such openings shall be measured for payment.

15.8.10. Rate - The rate shall include the cost of all labour and materials involved in all the operations described above.

15.9. SPECIFICATIONS FOR 6 MM CEMENT PLASTER FOR SLAB BEARING

15.9.0. Cement plaster shall be 6 mm thick finished with a floating coat of neat cement and thick coat of lime wash on top of walls for bearing of slabs.

15.9.1. Application - The plaster shall be applied over the cleaned and wetted surface of the wall. When the plaster has been brought to a true surface with a wooden straight edge (Clause 15.5.3) it shall be uniformly treated over its entire area with a paste of neat cement and rubbed smooth, so that the whole surface is covered with neat cement coating. The quantity of cement applied for floating coat shall be 1 kg per sqm. Smooth finishing shall be completed with trowel immediately and in no case later than half an hour of adding water to the plaster mix. The rest of the specifications described in 15.5.3 shall apply.

15.9.2. Lime wash - This shall be applied in a thick coat after curing the plaster for three day

15.9.3. Measurements - Length and breadth shall be measured correct to a cm and area worked out in sqm correct to two places of decimal.

15.9.4. Rate - The rate shall include the cost of all labour and materials involved in all the operations described above.

18. RELEVANT BIS CODE FOR TECHNICAL SPECIFICATION

S. No.	IS Code	Description
A. EARTHWORK IN EXCAVATION AND BACKFILLING		
1	IS: 783	Code of Practice for laying of concrete pipes.
2	IS: 1200 (Part 1)	Method of measurement of building and civil engineering works - Earth Work.
3	IS: 1489	Specification for Portland Pozzolana Cement
4	IS:2720 (All Parts)	Methods of test for soils.
5	IS:2809	Glossary of terms and symbols relating to soil engineering.
6	IS:3764	Safety code for excavation work.
7	IS:4081	Safety code for blasting and related drilling operations.
8	IS:4988 (All Parts)	Glossary of terms and classifications of earth moving machinery.
B. PLAIN, REINFORCED AND PRESTRESSED CONCRETE		
1	IS: 269	Specification for 33 Grade Ordinary Portland Cement.
2	IS: 303	Specification for Plywood for General Purpose.
3	IS: 383	Specification for Coarse and Fine Aggregates from Natural Source for Concrete.
4	IS: 432 (All	Specifications for Mild Steel and Medium-tensile Steel Bars and Hard-drawn Steel Wire for Concrete Reinforcement.

	Parts)	
5	IS: 432 (Part - I)	Mild Steel and Medium-tensile Bars.
6	IS: 432 (Part - II)	Hard-drawn Steel Wire.
7	IS: 455	Specification for Portland Slag Cement.
8	IS: 456	Code of Practice for Plain and Reinforced Concrete.
9	IS: 460	Specification for Test Sieves.
10	IS: 515	Specification for Natural and Manufactured Aggregates for use in Mass Concrete.
11	IS: 516	Methods of Tests for Strength of Concrete.
12	IS: 650	Standard Sand for Testing of Cement.
13	IS:1199	Sampling and Analysis of Concrete.
14	IS:1200	Method of Measurement of Building Works.
15	IS:1489	Specification for Portland Pozzolana Cement.
16	IS:1542	Sand for Plaster.
17	IS:1566	Specification for Hard-drawn Steel Wire Fabric for Concrete Reinforcement.
18	IS:1785	Specification for Plain Hard-drawn Steel Wire for Prestressed Concrete (Part - I) - Cold Drawn Stress Relieved Wire.
19	IS:1786	Specification for High Strength Deformed Steel Bars and Wires for Concrete Reinforcement.
20	IS:1791	Batch Type Concrete Mixers.
21	IS:2386	Methods of Test for Aggregates for Concrete (8 Parts).
22	IS:2502	Code of Practice for Bending and Fixing of Bars for Concrete Reinforcement.
23	IS:2505	General Requirements for Concrete Vibrators.
24	IS:2506	General Requirements for Screed Board Concrete Vibrators.
25	IS:2722	Specification for Portable Swing Weigh Batcher (single and double bucket type).
26	IS:2911	Code of Practice for Design and Construction of Pile Foundation.
27	IS:3366	Pan Vibrators.
28	IS:3558	Code of Practice for the use of Immersion Vibrators for Consolidating Concrete.
29	IS:3370	Code of Practice for Concrete Structures for the (All Parts) Storage of Liquids.
30	IS:4656	Form Vibrators for Concrete.
31	IS:5525	Recommendation for Detailing of Reinforcement in Reinforced Concrete Works.
32	IS:5640	Method of Test for Determining Aggregate Impact Value of Soft, Coarse Aggregate.
33	IS:5816	Method of Test for Splitting Tensile Strength of Concrete Cylinder.
34	IS:6006	Specification for Uncoated Stress Relieved Strand for Prestressed Concrete.

35	IS:6461	Cement Concrete : Glossary of Terms.
36	IS:8041	Specifications for Rapid Hardening Portland Cement.
37	IS:8043	Specifications for Hydrophobic Cement.
38	IS:8112	Specification for 43 Grade Ordinary Portland Cement.
C. STEEL REINFORCEMENT		
1	IS:1785	Cold Drawn Stress relieved wire (Part I).
2	IS:1786	Specification for Cold Twisted Steel Bars for Concrete Reinforcement.
3	IS:2751	Code of Practice for Welding of M.S.Bars.
4	IS:5525	Recommendation for detailing of Reinforcement in Reinforced Concrete Works.
5	IS:6006	Uncoated Stress Relieved Strand for Prestressed Concrete.
6	IS:14268	Specifications for uncoated stress Relieved Low Relaxation Seven Ply Strand for Prestressed Concrete.
7	IS:800	General Construction in Steel
8	IS:816	Metal-arc welding for general construction in mild steel
9	IS:817	Training & Testing of metal-arc welders
10	IS:226	Structural Steel Sections
11	IS:2062	Weldable Structural Steel
12	IS:814	Welding Electrodes
13	IS:919	Recommendations for limits and fits for Structural Engineering.
14	IS:1477	Code of Practice for painting of ferrous metals in buildings.
15	IS:1977	Structural Steel (Ordinary quality)
16	IS:7205	Safety Code for erection of structural steel work
17	IS:7215	Tolerances for fabrication of steel structures
18	IS:8500	Weldable structural steel (medium and high strength qualities).
D. RUBBLE MASONRY		
1	IS:1121 (All Parts)	Methods of test for determination of strength properties of natural building stones.
2	IS:1122	Methods of test for determination of true specific gravity of natural building stones.
3	IS:1123	Method of identification of natural building stone.
4	IS:1124	Method of test for determination of water absorption, apparent specific gravity and porosity of natural building stones.
5	IS:1125	Method of test for determination of weathering of natural building stones.
6	IS:1126	Method of test for determination of durability of natural building stones.
7	IS:1127	Recommendations for dimensions and workmanship of natural building stones for masonry work.
8	IS:1129	Recommendation for dressing of natural building stones.

9	IS:1597	Code of Practice for construction of stone masonry.
10	IS:1597 (Part I)	Rubble stone masonry
11	IS:1597 (Part II)	Ashlar masonry
12	IS:2250	Code of Practice for preparation and use of masonry mortars.
E. PLASTERING AND POINTING		
1	IS: 269	Specification for 33 Grade Ordinary Portland Cement.
2	IS: 712	Specification for Building Limes.
3	IS:1542	Specification for Sand for Plaster.
4	IS:1630	Specification for Mason's Tools for plaster work and pointing work.
5	IS:1661	Code of Practice for application of cement lime plaster finishes.
6	IS:2402	Code of Practice for external rendered finishes.
7	IS:8041	Specification for Rapid Hardening Portland Cement.
8	IS:8112	Specification for 43 Grade Ordinary Portland Cement.
9	IS:12600	Specification for Low Heat Portland Cement.
F. PAINTING		
1	IS: 63	Whiting for Paints.
2	IS:110	Reading mixed paint, brushing, gray filler for Enamels, for use over primers.
3	IS:426	Specification for paste filler for color coats.
4	IS:428	Specification for Distemper, Oil Emulsion, color as required.
5	IS:710	Specification for Marine Plywood.
6	IS:1477 (Part I)	Code of Practice for painting of ferrous metals in buildings - Pretreatment.
7	IS:1477 (Part II)	Code of Practice for painting of ferrous metals in buildings - Painting.
8	IS:2338 (Part I)	Code of Practice for finishing of wood and wood based materials - Operations and Workmanship for finishing.
9	IS:2338 (Part II)	Code of Practice for finishing of wood and wood based materials - Schedules.
10	IS:2395 (Part I)	Code of Practice for painting concrete masonry and plaster surfaces - Operation and workmanship.
11	IS:2395 (Part II)	Code of Practice for painting concrete masonry and plaster surfaces - Schedules.
12	IS:2524 (Part I)	Code of Practice for painting of non-ferrous metals in buildings - Pre-treatment.
13	IS:2524 (Part II)	Code of Practice for painting of non-ferrous metals in buildings - Painting.
14	IS:3140	Code of Practice for painting asbestos cement building products.

15	IS:5410	Specification for cement paints, colour as required.
G. STEEL, ALUMINIUM AND IRON WORK		
1	IS:1956	Glossary of terms relating to iron and steel.
2	IS:814 (Part I)	Specifications for covered electrodes for metal arc welding of structural steel - For welding products other than sheets.
3	IS:814 (Part II)	Specifications for covered electrodes for metal arc welding of structural steel - For welding sheets.
4	IS:815	Classification and Coding of covered electrodes for metal arc welding of structural steel.
5	IS:818	Code of Practice for safety and health requirements in electric and gas. welding and cutting operations.
6	IS:1182	Recommended Practice for Radiographic examination of fusion welded butt joint in steel plates.
7	IS:1148	Specification for Rivet Bars for structural purposes.
8	IS:816	Code of Practice for use of metal arc for general construction in mild steel.
9	IS:3600	Method of testing fusion welded joints and weld metal in steel.
10	IS:6227	Code of Practice for use of metal arc welding in tubular structure.
11	IS:6248	Specifications for metal rolling shutter and rolling grill.
12	IS:1081	Code of Practice for fixing and glazing of metal (steel and aluminium) Doors, Windows and Ventilators.
13	IS:1361	Specifications for steel windows for Industrial Buildings.
14	IS:1200 (part VIII)	Method of Measurement of steel work and iron work
15	IS:1038	Specifications for steel doors, windows and ventilators.
16	IS:226	Specifications for structural steel (Standard Quality).
17	IS:823	Code of Procedure for manual metal arc welding of metal steel.
18	IS:102	Ready mixed paint, brushing, red lead non-sitting, priming.
19	IS:1363	For black hexagonal bolts, nuts and lock-nuts (dia 6 to 39 mm) & black hexagonal screws (dia 6 to 24 mm)
20	IS:813	Scheme of symbols for welding.
21	IS:817	Code of Practice for training and testing of metal arc welders. (Revised)
22	IS:800	Code of Practice for use of structural steel in general building construction.

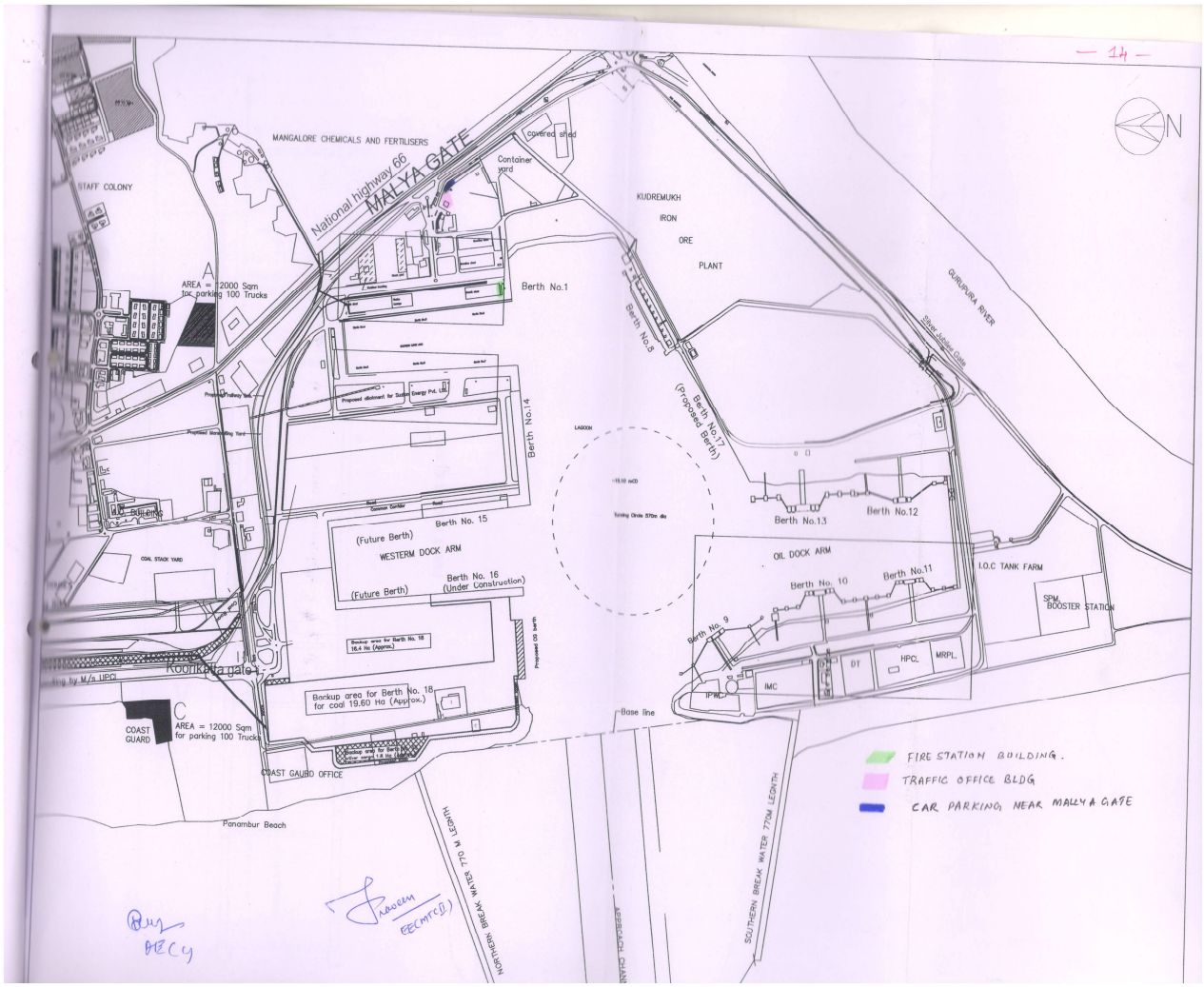
SECTION V

DRAWINGS

Brief Description of drawing

The Works are shown in the following drawings that are issued as a part of the Tender Documents:

Sl. No	Drawing No.	Description
1	22/92/MTC-II/2022-TS	01
2	22/92/MTC-II/2022-TS	02
3	22/92/MTC-II/2022-TS	03
4	22/92/MTC-II/2022-TS	04
5	22/92/MTC-II/2022-TS	05



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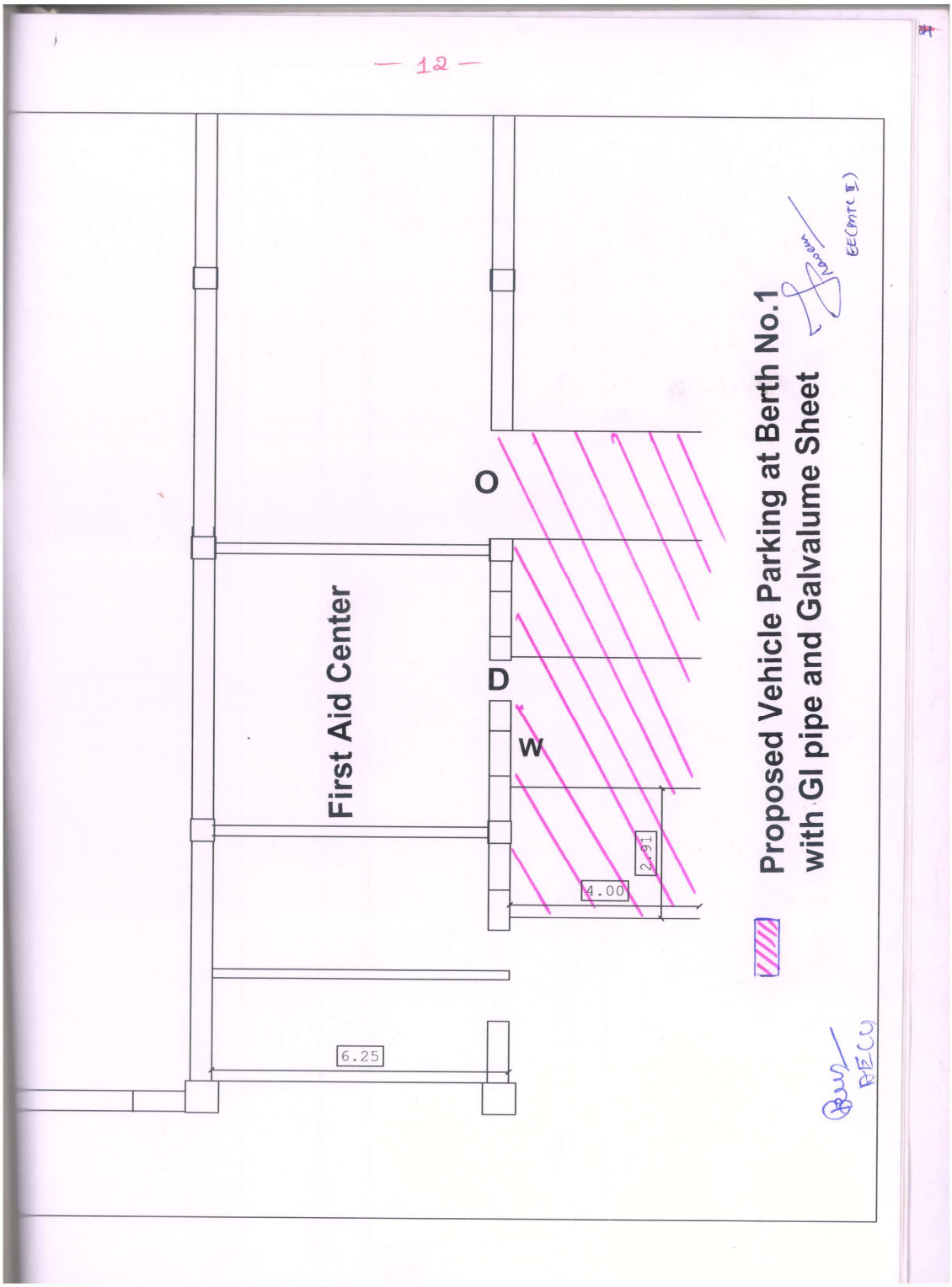

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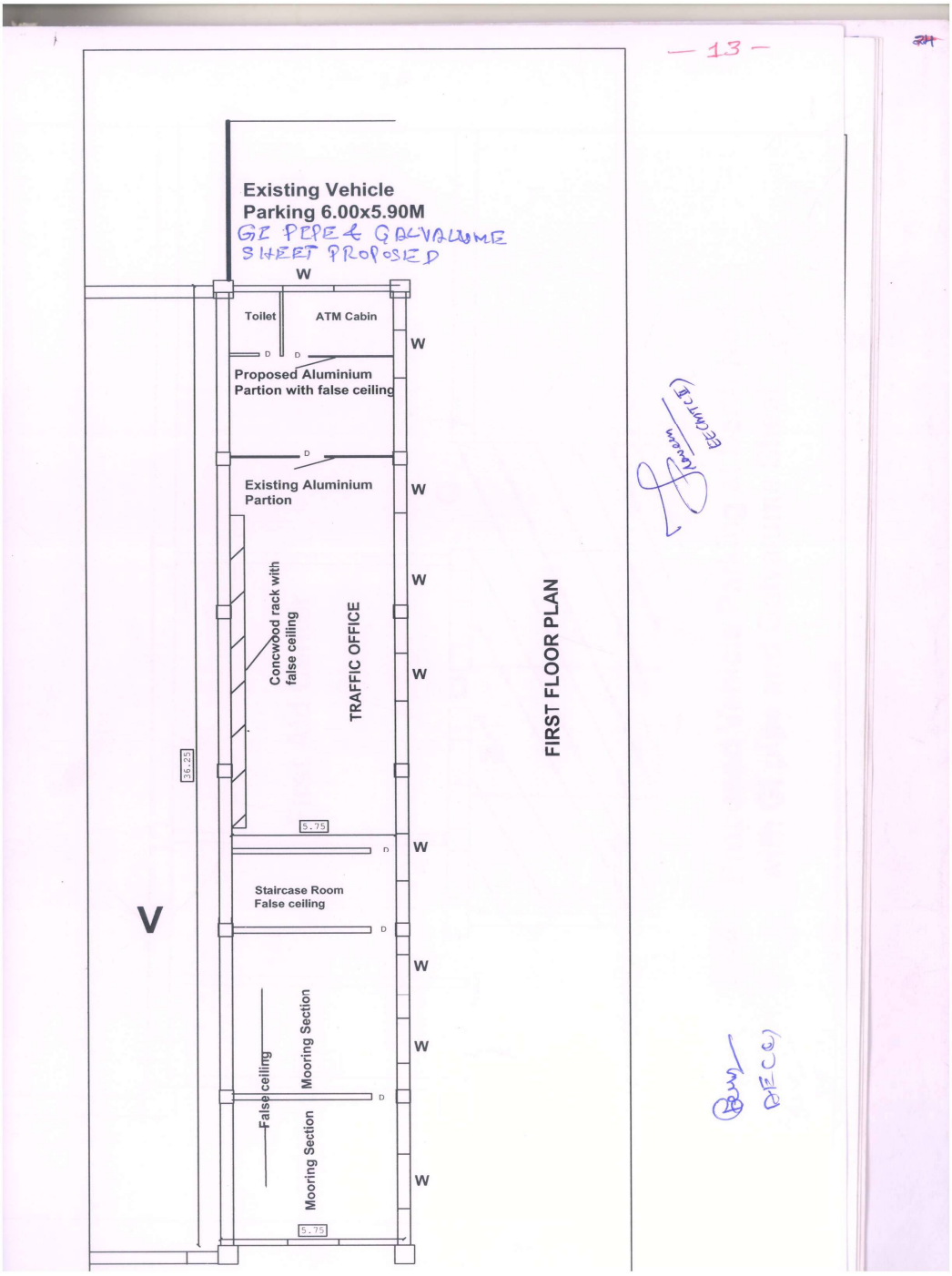

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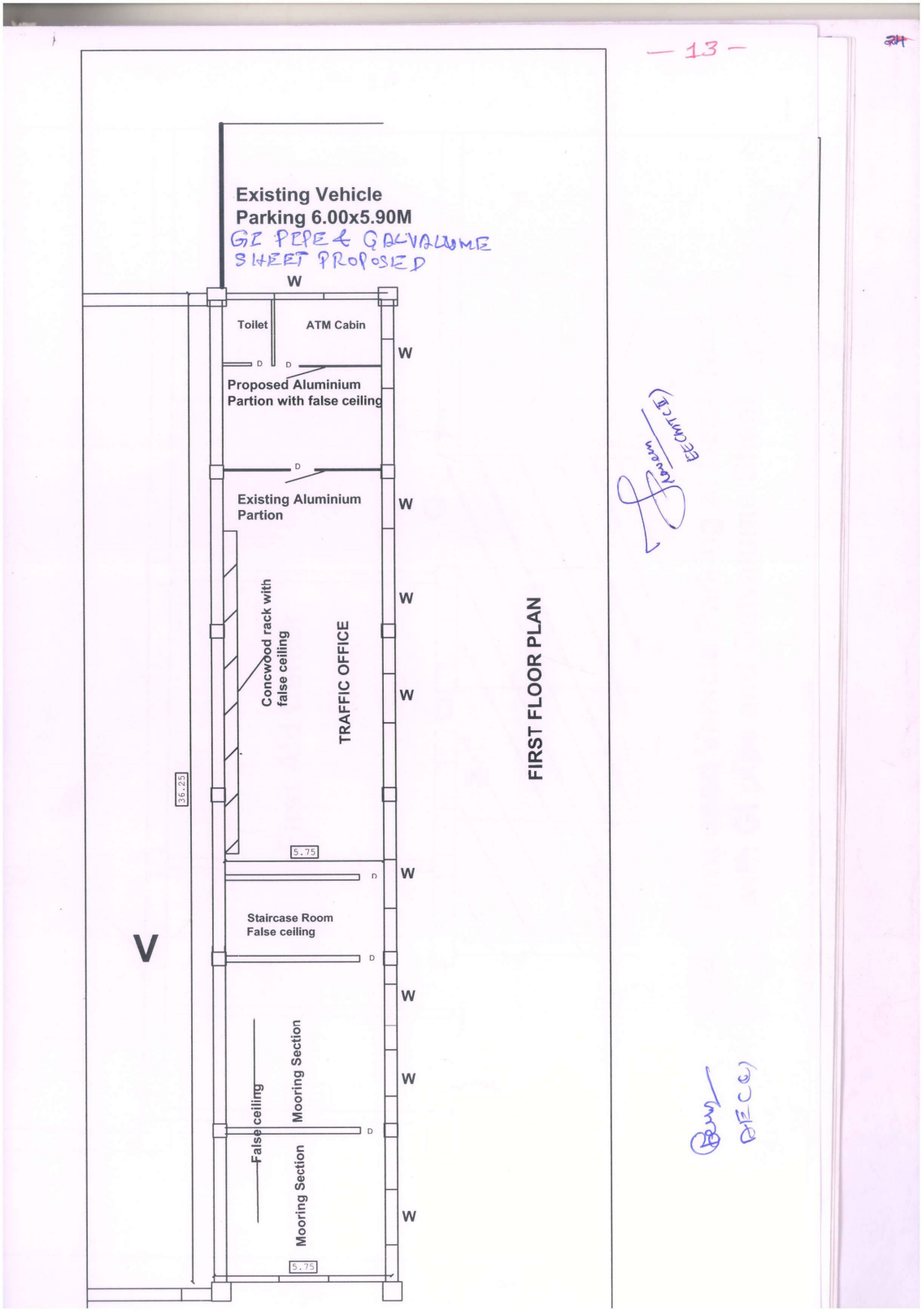

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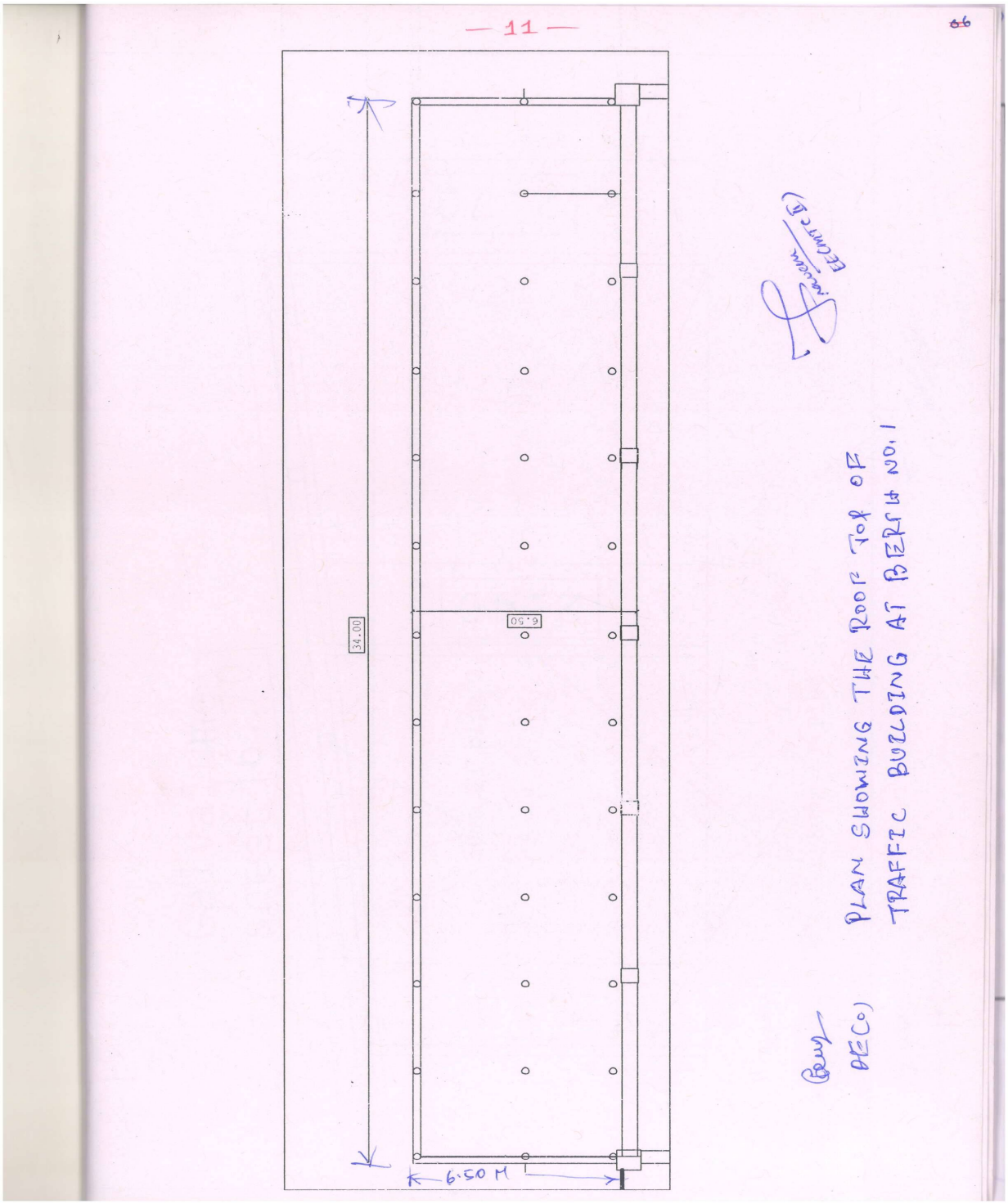

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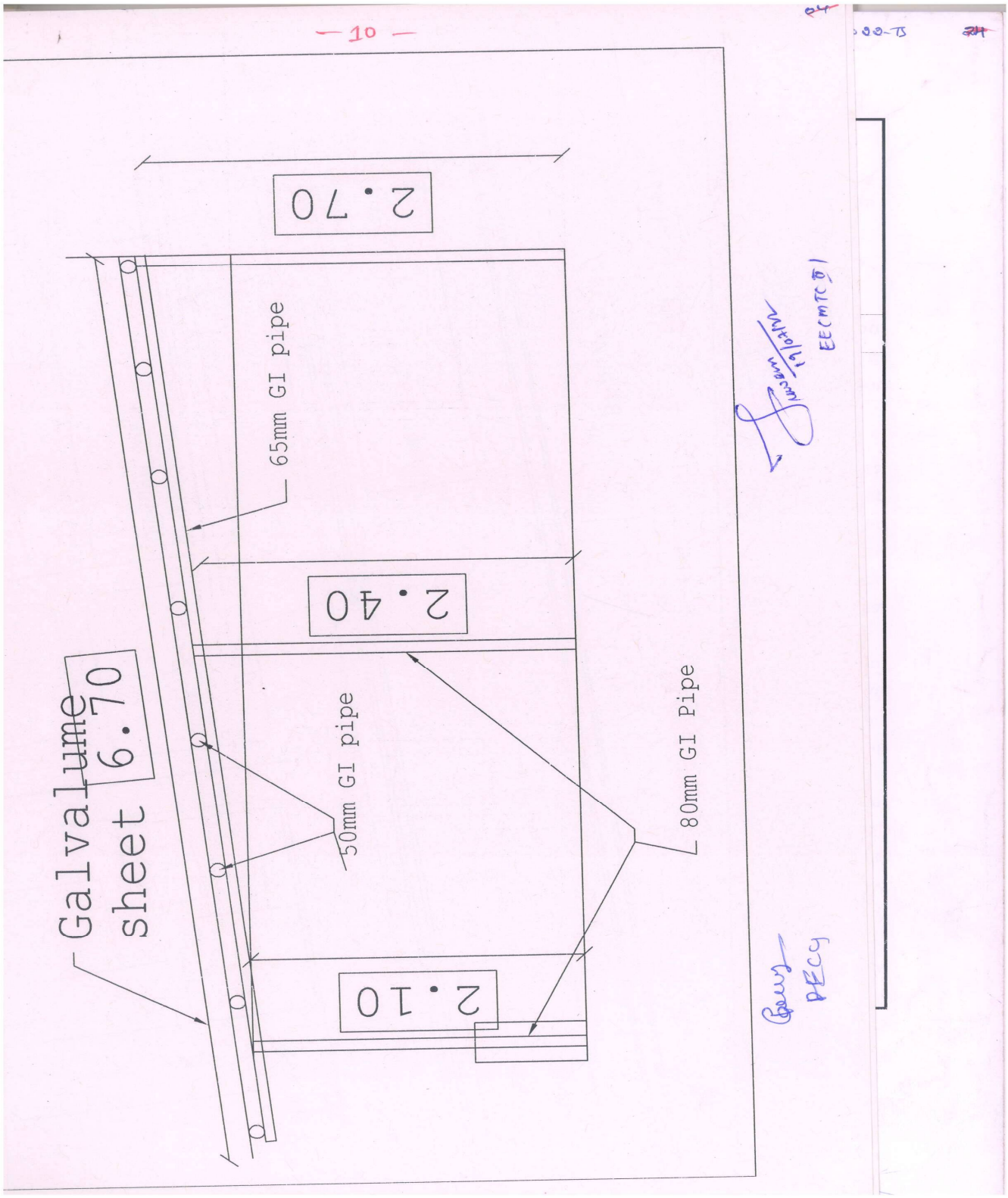

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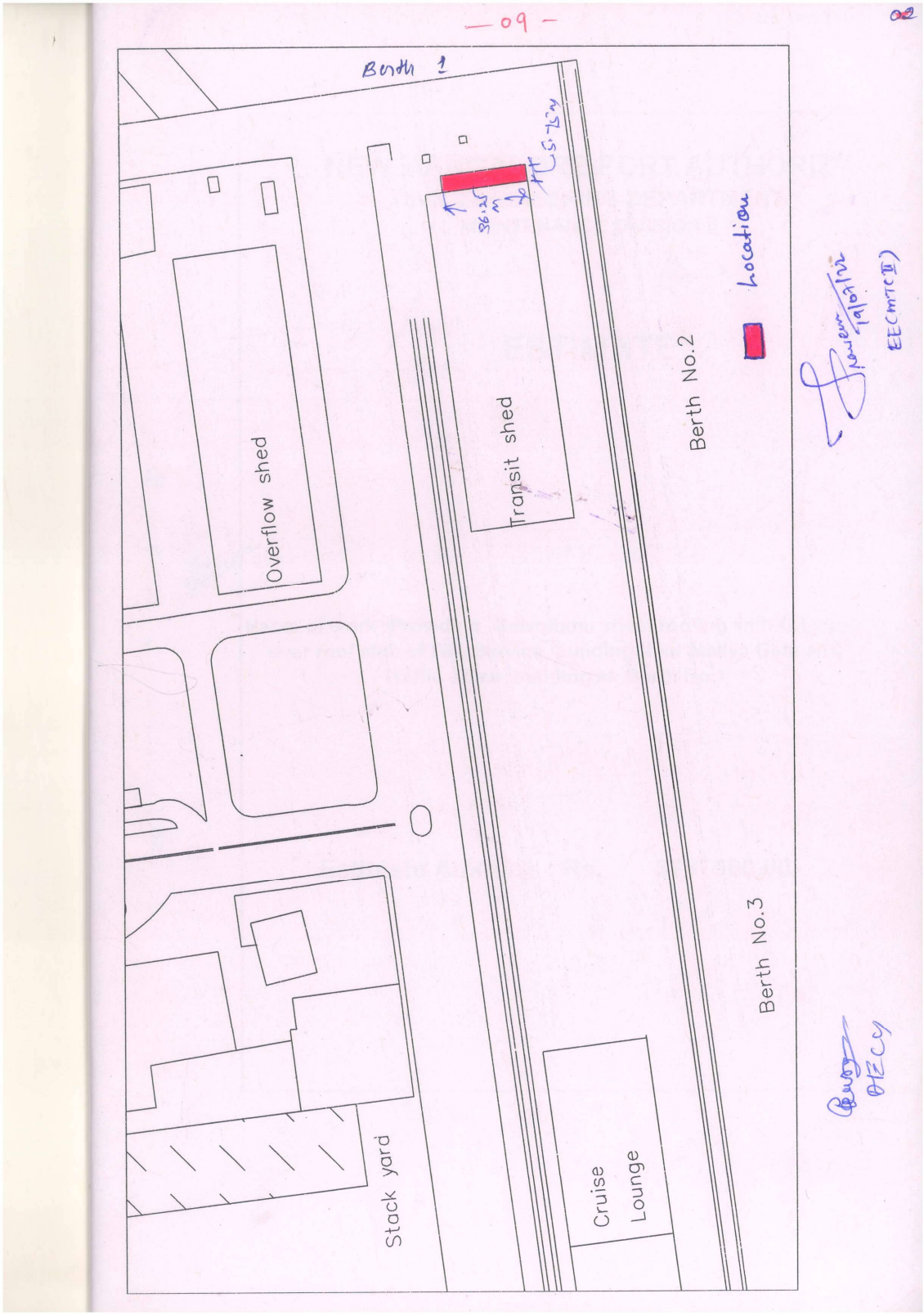

Sl. No	Drawing No.	Description
1	22/92/MTC-II/2022-TS	07

NEW MANGALORE PORT AUTHORITY
Panambur, Mangalore

"PROVIDING GALVOLUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1 "

TENDER DOCUMENT

Volume - III

BILL OF QUANTITIES

Table of Contents

VOLUME III

SECTION V I

(i) PREAMBLE TO BILL OF QUANTITIES

1. General Instructions

1.1 General

1.1.1 This Bill of Quantities must be read with the Drawings, Conditions of Contract and the Specifications, and the Contractor shall be deemed to have examined the Drawings, Specifications, Conditions of Contract and to have acquainted himself with the detailed descriptions of the Works to be done, and the way in which they are to be carried out.

1.1.2 Notwithstanding that the work has been sectionalized every part of it shall be deemed to be supplementary to and complementary of every other part and shall be read with it or into it so far as it may practicable to do so.

1.1.3 The detailed descriptions of work and materials given in the Specifications are not necessarily being repeated in the Bill of Quantities.

1.1.4 The Contractor shall be deemed to have visited the Site before preparing his tender and to have examined for himself the conditions under which the work will proceed and all other matters affecting the carrying out of the worksand cost thereof.

1.1.5 The Tenderer will be held to have familia rised himself with all local conditions, in so far as they affect the work, means of access and the locality of existing services, in order to execute the Works measured and described hereinafter. No claims for want of knowledge in this respect will be reimbursed.

1.2 Rates and Prices to be Inclusive

1.2.1 Rates and prices set against items are to be the all inclusive value of the finished work shown on the Drawings and/or described in the Specification or which can reasonably be inferred there from and are to cover the cost of provision of plant, labour, supervision, materials, test charges, freight, transportation, erection, installation, performance of work, care of works, insurance, maintenance, overheads and profits and every incidental and contingent cost and charges whatsoever including taxes if any excluding GST including every kind of temporary work executed or used inconnection therewith (except those items in respect of which provision has been separately made in the general condition of contract) and all the Contractor's obligations under the Contract and all matters and things necessary for the proper completion and maintenance of the Works.

1.2.2 The rates and prices set down against the items are to be the full inclusive value of the finished work shown on the Drawing and/or described in the Specification or which can reasonably be inferred the reform and to cover the cost of every description of Temporary Works executed or used in connection therewith (except those items in respect of which specific provision has been separately made in these Bills of Quantities) and all the Contractor's obligations under the Contract including testing, giving samples and all matters and things necessary for the proper execution, completion and maintenance of the Works.

1.2.3 The Specifications are intended to cover the supply of material and the execution of all work necessary to complete the works. Should there be any details of construction or material which have not been referred to in the Specifications or in the Bill of Quantities and Drawings, but the necessity for which may reasonably be implied or inferred there from, or which are usual or essential to the completion of all works in all trades, the same shall be deemed to be included in the rates and prices entered in the Bill of Quantities. The rates and prices are to cover the item as described in the Bill of Quantities and if there is inconsistency in the description between the Bill of Quantities, Specifications or Drawings, the interpretation

will be done according to General Conditions of Contract.

1.2.4 The quantities given in the Bill are approximate and are given to provide a common basis for ten dering. They are not to be taken as a guarantee that the quantities scheduledwill be carried out or required or that they will not be exceeded. The Employer / Engineer reserves the right to delete any item and / or increase / reduce quantities indicated in the Bills of Quantities at any time. Payment will be made according to the actual quantities of work ordered and carried out in the contract. However, the rates quoted shall be valid for any extent of variation in quantity of each individual item provide d that the total contract value does not get altered by more than indicated in conditions of contract. No claim whatsoever for extra payment due to variation of quantities within the above said limit would be entertained.

1.2.5 The drawings for tender pu rposes are indicative only of the work to be carried out. However, the Tenderer must allow within his price for the items of work included in the Tender Documents for the details which will appear on subsequent drawings developed for construction purposes. Rate and price shall include any additional design/ detailing to be carried out by contractor.

1.2.6 The rates and prices shall include (except where separate items are given) for the provision and operation of the following items, for compliance with the Con ditions of Contract, Special Conditions, the specifications and Tender drawings:

i) Supervision and labour for the Works;
ii) All materials, installation/erection, handling and transportation;
iii) All Contractor's Equipment;
iv) All testing, commissioning, insurance, maintenance, security, welfare facilities, overheads and profit and every incidental and contingent costs and charges whatsoever including;
v) All temporary fencing, watching, lighting, sanitary accommodation, general security arrangements,

welfare facilities and first aid provision;

vi) Provision and maintenance of Contractor's site offices, cabins, huts, maintenance and storage areas;

vii) Taxes if on the transfer of property in goods in the execution of works, other than GST, Customs Duty for materials to be permanently incorporated into the Works);

viii) All necessary temporary services including fresh water, compressed air lines, electrical cabling and switchgear, telephone, walkie -talkie and facsimile facilities;

ix) The maintenance of all Contractor's services;

x) All insurances for the Works;

xi) Allowance for complying with all environmentalaspects as specified;

xii) Detail design of components of temporary works, wherever necessary as directed by Engineer.

1.4 Method of Measurement

1.4.1 Measurement of Work shall be in accordance with IS 1200 and shall be net off the dimensions of the works shown on the drawings except as mentioned below:

1.4.2 Units of Measurement: The units of measurement used in this Bill of Quantities are in metric units as follows:

i) Linear: Linear metre, centimeterormillimeter abbreviated to 'Rm', 'cm' or 'mm' respectively.

ii) Superficial: Square metre or Square centimeter abbreviated to 'Sq.M' or 'sq.cm' respectively.

iii) Volumetric: Cubic metre abbreviated to 'cu.m'. Litre abbreviated to 'L'

iv) Weight: Tonne = 1000 Kilograms, abbreviated to 'T', / 'MT' Kilogram abbreviated to 'kg'

v) Numbers: Numbers abbreviated to Nos. or No.

vi) Lump sum: Lump sum abbreviated to 'L.S.'

1.5 Currency

1.5.1 All monetary reference herein and the Bill of Quantities shall be priced in Indian Rupee Currency.

2. Civil Works

2.2 Precast Concrete

2.2.1 Shuttering for precast concrete shall not be measured and paid for separately.

2.2.2 Effort for placement of pre cast concrete at the final locations shall not be measured unless a specific item is provided in the Bill of Quantities.

2.2.3 The precast concrete units shall be measured as shown on the detailed drawings.

2.3 In-situ Concrete

2.3.1 Shuttering for In-situ concrete shall not be measured and paid for separately.

2.3.2 No deduction will be made for chamfers smaller than 50 sq.cm. sectional area, reinforcement bolts and other embedded parts unless larger than 0.1 sq.m. sectional area an d 0.03 cu.m. in volume. No extra volume will be measured for splays or fillets smaller than 50 sq.cm. sectional area.

2.3.3 The rates for reinforced concrete shall include for all batching, mixing, transporting, hoisting or lowering to any height / depth, placing in position and compaction in work of any sectional area or thickness including shuttering, forming necessary construction joints, shear keys and stop ends, and for curing and protecting etc. all as specified.

2.3.4 The rates shall include for preparing construction joints, shear keys and surfaces against which next stage concrete is to be cast and building in fittings including pipes and bolts except where specifically billed separately. No separate payment will be made for making openings/pockets/pits of any size and shape. Where surfaces are to receive finishes the rates shall include for leaving the surface rough or for hacking and roughening the surface to form a key.

2.3.5 Unless otherwise noted, rates shall include for inserting pipes and other inserts in position accurately, concreting while they

are in position and also for protecting the same as the work proceeds.

2.3.6 Unless otherwise noted, the rates for concrete items shall include for finishing the top surface to levels and slopes and surface finish as specified. Rates for concrete shall include for finishing the slab to specified slope towards drains, etc.

2.4 Reinforcement

2.4.1 Steel reinforcement will be measured by weight and fixed in accordance with Drawings and Specifications. The weight of reinforcement bars - whether plain, deformed or ribbed etc., - of various diameters will be calculated in accordance with Table 1 of IS:1732 'Dimensions for Round and Square Steel Bars for Structural and General Engineering Purposes'.

2.4.2 The rates shall include for cutting , weldinglaps, and waste, straightening short and long lengths, bending, fixing, rolling margin and the provision of spacer bars or support, chairs, binding wire, saddles, forks and all dense concrete spacer blocks, etc., including preparing bending schedules from the Drawings.

2.4.3 The rates shall include for all necessary descaling, wire brushing and cleaning to remove all rust and mill scale, dirt, grease and other deleterious matter before fixing and whilst still exposed during construction.

2.5 Structural and Miscellaneous Steel work

2.5.1 Rates for structural steel w ork and iron work shall include supply, fabrication, delivery and erection/embedment in concrete at Site and all charges for welding, cutting, bending, bolting, site connections, fixing to foundations.

2.5.2 The rates for Structural Steelwork shall inclu de:

i) Supply, fabrication, delivery and erection
ii) Rolling margin, cutting and waste, weld metal, bolts, fixings and fittings
iii) Hoisting, drilling, bolting or welding and fixing in the manner specified or indicated in the drawing
iv) Fabrication drawings
v) Welding trials and tests

vi) Erection trials

vii) Protective treatment (painting, hot dip galvanizing etc), including making good any damage if provided in the BOQ item.

2.5.3 Metalwork items are described in the Bills of Quantities and the Tenderer is to include for all the fittings, etc., described. All items shall include the necessary fabrication, joints, angles, intersections and ends, all bolts or fixing lugs, all hoisting and scaffolding required and casting in fixings or later cutting out or forming pockets for same, grouting, supporting and makinggood.

2.5.4 Rates are to include for all necessary scaffolding, working over water and at any height staging and hoisting and tarpaulin or other protective covers and the cleaning and removal of paint stains and spots, etc.

3.4.1 The Contractor's unit rates and prices shall include all equipment, apparatus, material indicated in the Drawings, and/or Specifications in connection with the item in question and also associated labour as well as all additional equ ipment, apparatus, material, consumables usually necessary to complete the system even though not specifically shown, described or otherwise referred to and also associated labour.

3.4.2 The rate for providing and fixing above items shall include all fittings, fixtures, base and sole plates, anchor bolts, including epoxy grouting, etc. all complete as specified, including the necessary additional supervision to ensure accurate alignment

3. Abbreviations

4.1.1 The following abbreviations are used in the Specifications and Bill of Quantities:

IS :	Indian Standard
BS :	British Standard
Qty. :	Quantity
mm :	Millimeters
cm :	Centimeters
M / m / MTR :	Meters
LM :	linear metre
LS :	lump sum
Rs. :	Rupees

P. :	Paise
Nos. :	Numbers
do :	Ditto
MS :	mild steel
T :	Tones
Kg :	Kilogram
EO :	Extra over (previous sum unless specified otherwise)
sq.m. /m^2 /SQMT:	square metre
sq.cm. :	square centimeters
mm^2 :	Square Millimetre
Cu.m/CUM . :	cubic meters
YST :	yield stress
dia :	Diameter
wt. :	Weight
Drg.No.:	drawing number
max. :	Maximum
min :	Minimum
approx :	Approximately
n.e.:	not exceeding
incl:	Including
circ:	Circular
set :	set / sets
c/c	centre to centre
@ :	at the rate of

ii) BILL OF QUANTITIES

NAME OF WORK :PROVIDING GALVOLUME SHEET ROOFING WITH G.I PIPES OVER ROOF SLAB OF FIRE SERVICE BUILDING NEAR MALLYA GATE AND TRAFFIC OFFICE BUILDING AT BERTH NO.1

Item No.	DESCRIPTION OF ITEM	QTY	UNIT	RATE IN figures	AMOUNT (Rs. Ps.)
1	Dismantling A.C. sheet roofing and stacking the material within a radius of 150 meters. including cost of materials, labour, HOM complete as per specifications.	61.00	Sqm	98.00	5978.00
2	Demolishing brick work manually/ by mechanical meansincluding stacking of serviceable material and disposal of unserviceable materialto the appropriate disposal area as per direction of Engineer-in-charge.	4.00	CUM	369.00	1476.00
3	Demolishing cement concrete manually/ by mechanical means including disposal of material to the appropriate disposal area as per direction of Engineer-in-charge.	4.00	CUM	1274.00	5096.00
4	Earth work excavation by manual means for drains, canals, waste weir, draft, approach channels, key trenches, foundation of bridges and such similar works in all kinds of soils , as per drawing and technical specifications, including setting out, shoring, strutting, barricading, caution lights, removal of stumps and other deleterious matter, excavated surface leveled and sides neatly dressed disposing off the excavated stuff or sorting & stacking the selected stuff for reuse in a radius of 50 m and lift upto 1.5 m including cost of labour, tools & other appurtenances required to complete the work. In all kinds of soils Depth upto 1.5 m	34.00	Cum	186.00	6324.00
5	Providing and laying in position plain cement concrete for	15.00	Cum	5752.00	86280.00

	levelling course for all works in foundation. The granite / trap / basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed, laid in layersnot exceeding 150 mm thickness, well compacted using plate vibrators, including all lead & lifts, cost of all materials of quality, labour, Usage charges of machineries, curing, and all the other appurtenances required to complete the work as per technical specifications. (Thecost of steel reinforcement & formwork shall be paid separately) Mix 1:3:6 (M10) Using 40 mm nominal size graded crushed coarse aggregates				
6	Providing and laying in position cement concrete for all Sub structures of building, Irrigation works, Sub structure works of bridges, Drain works & other parallel works from 0.50m to 3.50 m height. The granite/trap/basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed with super plasticisers, laid in layers, well compacted using needle vibrators, providing weep holes wherever necesary, including all lead & lifts, cost of all materials of quality, confirming to the requirements of relevant IS codes, labour, Usage charges of machinery, curing and all other appurtenances required to complete the work as per technical specifications. (The cost of steel reinforcement & formwork to be paid separately) 2.4.1 Mix 1:2:4 (M15) Using 20 mm nominal size graded crushed coarse aggregates	22.00	Cum	6096.00	134112.00
7	Scraping plaster in lime or cement mortar from brick /	560.00	SQM	21.00	11760.00

	stone masonry, including T&P and scaffolding wherever necessary, sorting the dismantled material, disposal of unserviceable material and stacking the serviceable material with all lifts completeas per specifications.				
8	Dismantling aluminium/ Gypsum partitions, fixed glazing and false ceiling including disposal of unserviceable material and stacking of serviceable material to the appropriate disposal area as per direction of Engineer-in-charge.	175.00	SQM	28.00	4900.00
9	Providing and laying in position Reinforced cement concrete for all Sub structures of building, Irrigation works, Sub structure works of bridges, Drain works & other parallelworks from 0.50m to 3.50 m height. The granite/trap/basalt crushed graded coarse aggregates and fine aggregates as per relevant IS Codes machine mixed with super plasticisers, laid in layers, well compacted using needle vibrators, providing weep holes wherever necesary, including all lead & lifts, cost of all materials of quality, confirming to the requirements of relevant IS codes, labour, Usage charges of machinery, curing and all other appurtenances required to complete the work as per technical specifications. (The cost of steel reinforcement & formwork to be paid separately) 2.4.1 Mix 1:2:4 (M15) Using 20 mm nominal size graded crushed coarse aggregates.	13.00	CUM	6096.00	79248.00
10	Providing TMT bars of grade Fe-550 steel reinforcement for RCC work including straightening, including straightening, cutting, bending, placing in position, binding and	1300.00	KG	88.00	114400.00

	anchoring to adjacent members whereever necessary complete as per Design including cost of material, labour, usage charges complete as per specifications. (The laps and wastages shallnot be measured separately)				
11	KSRB 4-6.1 : Providing and removing centering, shuttering, strutting, propping etc., and removal of form work for foundations, footings, bases of columns for mass concrete including cost of all materials, labour complete as per specifications. Specification No. KBS 4.6.2	109.00	SQM	263.00	28667.00
12	Providing 15 mm cement plaster on rough side of single or half brick wall finished with a floating coat of neat cement of mix 1:3 (1 cement: 3 fine sand) including rounding off corners wherever required smooth rendering, providing and removing scaffolding, including cost of materials, labour, curing complete as per specifications and as per directions of Engineer-in-charge.	846.00	SQM	321.00	271566.00
13	Providing and fixing 80mm G.I. B class pipe of approved make and quality, including cost of materials, Labour charges, welding, painting fixing transportation charges and all other incidental charges etc. complete.	280.00	RM	902.55	252714.00
14	Providing and fixing 65mm G.I. B class pipe of approved make and quality, including cost of materials, labour charges, welding, painting fixing transportation charges and all other incidental charges etc. complete	510.00	RM	705.12	359611.20
15	Providing and fixing 50mm G.I. B class pipe of approved make and quality, including cost of materials, labour charges,	555.00	RM	465.37	258280.35

	welding, painting fixing transportation charges and all other incidental charges etc. complete.				
16	PROVIDING TRAPEZOIDAL PROFILED SHEET Providing and installing of pre painted Galvolume iron Trapezoidal profiled sheet of approvedmake 1060 mm width (1000 mm cover width), 28-30 mm crest height with crest distance of 200 mm c/c with 2 ribs at the centre for stiffening. The total coated thickness (TCT) of the sheet will be 0.47 mm +/- 0.02 mm tolerance Zinc-Alu Alloycoating AZ150 gsm as per ASTM 1397/A755-550 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 20-22 microns using self drilling/self tapping screws of 25 mm length, to be fixed over the existing purlins, rafters, channels and trusses.	790.00	SQMT	556.00	439240.00
17	Providing and installing of approved make pre painted Galvalume iron Accessories, like, plain, ridges, plain gutter, plain flashing, corner Trim, etc. The total coated thickness(TCT) of the sheet shall be 0.47mm +/- 0.02 tolerance mm Zinc-Alu Alloy coating AZ 150 gsm as per ASTM 1397/755 - 550 mpa steel grade, 5-7 microns epoxy primer on both side of the sheet and polyester top coat 20-22 microns usingself drilling / self tapping screwsof 25 mm length. (width upto500-600 mm only), to be fixed over the existing purlins, rafters, channels and trusses.	19.00	RM	361.00	6859.00
18	Finishing walls with Acrylic Smooth exterior paint ofrequired shade :New work (Two coat applied @ 1.67 ltr/10 m^2 over and including priming coat of exterior primer applied @	605.00	SQM	136.00	82280.00

	2.20 kg/10 m²) with paint of approved quality to give an even shade, after thoroughly brooming the surface to remove all dirt, dust, mortar drops and foreign matter including preparing the surface even and sand paper smooth, cost of materials, labour complete as per specifications and as per directions of Engineer-in-charge.				
19	Distempering with 1st quality acrylic distemper (ready mixed) having VOC content less than 50 gms/litre, of approved manufacturer, of requiredshade and colour complete, as per manufacturer's specification. Two coats on new work to give an even shade after thoroughly brooming the surface to Remove all dirt, dust, mortar drops and foreign matter Including preparing the surface even and sand paper smooth, cost of materials, labour complete as per specifications and as per directions of Engineer-in-charge	320.00	SQM	62.00	19840.00
20	Providing and fixing 110 mm dia to wall, ceiling and floor unplasticised PVC 6.00 kgs/sqcm working pressure with pipe fittings, wall clips etc., and making good the wall,ceiling and floor for sanitary pipelines including cost of all materials, labour charges, HOM and testing complete as per specifications.	16.00	RM	434.00	6944.00
21	Providing and fixing 8mm thick MS plate valley gutter of approved make and quality, including cost of materials, labour charges, welding, painting, fixing charges, transportation charges and all other incidental charges etc. complete.	2695.00	KG	83.84	225948.80
22	Providing pressure grouting to slab, including cost of all	8.00	NO	4025.00	32200.00

	materials, cost of labour, machinery, transportation, tool and plants and all other incidental charges etc. complete as directed by the department.				
23	Providing false ceiling using 9mm thick PVC sheets supported with aluminium T&L sections(0.3mm thick) having 25mm flange & web. The aluminium frame work should be fixed to ceiling with necessary aluminium fixtures like Flats/GI wire with adjustable J Bolts etc with frames at 600 c/c to fix the ceiling pannels in position etc., complete with all cost of materials T&P labour and all other incidental charges etc., complete.	175.00	SQM	1423.54	249119.50
24	Providing, fabricating, assembling and fixing inposition aluminium partitions using sections in combination of plain, single groove and double groove as per requirements for the frames of overall size 101.6mm x 44.45mm, 3.18mm.thick having section weight, plain sections 2.4Dkg/m single grove section 2.541kg/m. and double grove section 2.683 kg/m and bottom bottom member 114.3 mm x 44.45 mm 3.18 mm thick and 2.6 46 kg/m; aluminium louvres of size 77.6mmx27.6mm 1.7mm. thick section weight 0.483kg/m; bottom portions provided with 12mm. thick pre laminated sheet both side of approved colour lamination exteriorgrade; aluminium sections ofmat finish or glossy finish using section, spacing of vertical member shall not exceed 0.6 m. c to c; sections are cut to the required lengths, joints mitered and corners grinded subdividing frames tennoned	11.00	SQM	4795.00	52745.00

	and riveted to the frames, the assembled frame should be stiffened with corner angles stripped and fixed with screws, rawl plugs and teak wood gullies to RC.C.columns or masonry on sides, R.C.C. lintels or beams at top and floor at bottom, including cutting chistling and making good with cement mortar to match the surface, providing and fixing bottom panel filled with the materials to a height of 0.9m. from floor level; and 5.5mm. thick plain glass for middle portion viz., 0.9m. to 2.13 m. and top panel with lower sections, the glass and panels fitted with glazing clips of 19mmx17.3mm. with thickness of 0.9mm. weight 0.124kg/m; aluminium sections pre-treated for removal of any rust and prevention of further rust formation, and coated with greasy materials for non-adherence of mortars or any other sticky materials; vertical members embedded in the flooring by making suitable size holes and fixing with cement mortar, with necessary opening for fixing of doors of standard size (excluding cost of door opening) All the frame should be thoroughly cleaned free from rust, scale or dirt including cost of materials, fixtures, labour and HOM complete as per specifications using aluminum section powdered coated to a minimum of 60-70 microns with exterior durable pure polyester grade powder of approved quality.				
25	Providing, fabricating, assembling and fixing in position aluminium shutters to the existing door frame in the partition using 47.62x44.45mm section thickness 3.18mm, weight 1.505kg/m for vertical	2.50	SQMT	4018.00	10045.00

	frame; 47.62x44.45 thickness of 3mm, weight 1.42kg/m for top section,49.91mmx44.45mm with wall thickness 3mm, weight 1.495kg/m for central rail; and 114.3mmx44.45mm thickness 3.18mm, weight 2.646kg/m for bottom rail; aluminium sections and cut to length joint metred and corners grinded, the bottom rail and top rail hinged or pivoted, opening arrangements including providing and fixing standard approved accessories, such as aluminium handles, tower bolts, lock, pivots: hinges PVC. or rubber gasket, 12mm prelaminated sheets exterior grade of approved colour both sides same colour for bottom panel of maximumheight 0.90m and 5.5mm thick plain glass for top panel and glass fixed with glazed clips 19mmx17.3mmx11mm, 0.9mm thick, weight 0.124kg/m; aluminium sections treated for removal of any rust and prevention of further rust formation, and coated with greasy materials for non-adherance of mortars or any other sticky materials, including cost of materials, fixtures, labour and HOM complete as per specifications. using aluminium section powdered coated to a minimum of 60-70 microns with exterior durable pure polyester grade powder of approved quality.				
26	Providing and fixing in position aluminium windows and ventilators as per approved drawings with sliding shutters using double track window frame section of size 61.85x31.75mm. With 1.2mm thick, bottom section weight 0.695 kg/m, sides and top sections 1.3 mm. thick weight 0.659 kg/m; and shutter	3.00	SQM	4375.00	13125.00

	comprising top and bottom section of size 40mmx18mm, 1.25mm thick 0.417 kg./m; shutter outer side 40mmx18mm, 1.25mm.thick weight 0.417 kg/m, shutter interlock section 40mmx26.7mm, 1.1mm thick, weight 0.469 kg/m. the shutters mounted on nylon rollers with approved qualityof fixtures such as aluminium handles tower bolts etc.; and providing and fixing 5.5mm thick plain glass for shutters fitted with rubber beading aluminium sections including cutting to required length, joints mitred subdividing the frame tenonned and riveted in the assembled frame stiffened with end clips at corners angles etc, and fixed to the walls, lintels, floor beams/cills as the case may be with necessary steel screws, rawl plugs, or teakwood gatties including cutting masonry or concrete and making good the original surface using cement mortar, aluminium sections pretreated for removal of any Specification No. KBS using aluminium section powdered coated to a minimum of 60-rO microns with exterior durable pure polyester grade powder of approved quality.				
27	Providing and fixing Concrete plank shelves with steel fabricated structure, teak wood finish, including cost of painting to the wall and shelves, plastering if required, transportation, fixing, cutting, wall painting inside shelves, Tools & plants and all other incidental charges etc. complete as directed by the Department.	47.00	SQM	2019.59	94920.73

28	Providing, fabricating, assembling and fixing in position aluminium shutters of size (each door size1200x600mm) using 47.62x44.45mm section thickness 3.18mm, weight 1.505kg/m for vertical frame; 47.62x44.45 thickness of 3mm, weight 1.42kg/m for top section, 49.91mmx44.45mm with wall thickness 3mm, weight 1.495kg/m for central rail; and 114.3mmx44.45mm thickness 3.18mm, weight 2.646kg/m for bottom rail; aluminium sections and cut to length joint metred and corners grinded, the bottom rail and top rail hinged or pivoted, opening arrangements including providing and fixing standard approved accessories, such as aluminium handles, tower bolts, lock, pivots: hinges PVC. or rubber gasket, 12mm prelaminated sheets exterior grade of approved colour both sides same colour for bottom panel of maximumheight 1.20m aluminium sections treated for removal of any rust and prevention of further rust formation, and coated with greasy materials for non-adherance of mortars or any other sticky materials, including cost of materials, fixtures, labour and HOM complete as per specifications.. using aluminium section powdered coated to a minimum of 60-70 microns with exterior durable pure polyester grade powder of approved quality.. complete the as directed by the Department"	30.00	SQM	4018.00	120540.00
				Total Rs.	29,74,219.58
				Excess / Less (In percentage in two decimals)	

Quoted amount in Figures Rs.	

(Quoted amount - Rupees ……..

Note:

1. GST as applicable will be paid separately in the Tax invoice.
2. Contractor shall file the applicable returns with Tax department in time and submit the same as documentary evidence.

SIGNATURE OF THE BIDDER

(iii) FORM OF TENDER

NAME OF CONTRACT..... .....

To
The Chairman
New Mangalore Port Authority
Panambur
Mangalore - 575 010

Gentlemen,

1. We have examined the Conditions of Contract, Specification, Drawings, Bill of Quantities, and Addenda Nos ---------- for the execution of the above-named Works, and we the undersigned, offer to execute and complete such Works and remedy any defects therein in conformity with the Conditions of Contract, Specifications, Drawings and Bill of Quantities and Addenda
2. We acknowledge that the Appendix forms part of our Tender.
3. We undertake, if our Tender is accepted, to commence the Works as soon as is reasonably possible after the receipt of the Engineer's notice to commence, and to complete the wholeof the Works comprised in the Contract within the time statedin the Appendix to Tender.
4. We agree to abide by this Tender for the period of 1 20 days from the last date fixed for receiving the same and it shall remain binding upon us and may be accepted at any time before the expiration of that period.
5. Unless and until a formal Agreement is prepared and executed, this Tender together with your written acceptance thereof shall constitute a binding Contract between us.

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

Dated this_____day of_____201_____

Signature_____in the Capacity of_____ duly
authorised to sign Tenders for and on behalf of _____ ___ __ _____ _____ _____ _____

(IN BLOCK LETTERS)

Address:_____
_____
_____
_____

Witnesses

1. Signature : _____
Name : _____
Address : _____
_____
_____
_____

2. Signature : _____
Name : _____
Address : _____
_____
_____
_____

SECTION VI I

SCHEDULE – A

ROYALTY

SCHEDULE II

(See sub rule (1) of Rule 36)

Sl. No.	Nam'e of the Mineral	Present Rate of Royalty	Royalty to be revised	
			Export	Domestic
1	Ornamental and Decorative Building Stones as defined under clause(m) of Rule 2 A)Dyke Rock (i)Black granites: (a)Chamarajanagar District:	15% of Sale Value or of Average SellingPrice on advalorembasisor Rs.4,500 per m3 which is higher.	Rs.1,200 per MT	Rs.600 per MT
	(b)All other Districts other than(a)above	15% of Sale Value or of Average Selling · Price on advalorem basis orRs.1,500 per m3 which is higher.	Rs.1700 per MT	Rs.400 per MT
	(ii)Other varieties of dyke other than black granites(Entire State)	15% of Sale Value or of Average Selling Price on advulorembasis or Rs.1,500per m3 which is higher.	Rs.500 per MT	Rs.375 per MT
	(B)(l)Pink and Red Gran ites (Ilkal Pink Variety) (i) Hungunda and BadamiTaluk of Bagalkot District, Kustagi of Koppal District.	15% of Sale Value orof Average Selling Price on advalorembasis or Rs.1,200	Rs.1,000 per MT	Rs.400pe rMT
	(ii) Pink and Red Gran ites, Gneissess and their structural verities (otherthan Ilkal Pink Variety)	15% of Sale Value or Average Selling Price on advalorem basis or Rs.1,800 Variety) per m3 which is higher	Rs.600 per MT	Rs.350 per MT
	C)Grey and White Granites	15% of SaleValue or		

	and their varieties: (i) Very fine grained Grey granite (SiragreyVariety) Price on Chintanmi, Siddlaghatta ofChikkaballapuraDistrictHoskote of Bangalore District.	of Average Selling Price on advalorembasisor Rs.1,350 per m3 which is higher.	Rs.500 per MT	Rs.350 per MT
	(ii) Greyandwhitegranites and textural varieties having shades of grey, balckand white colours (other than (i) above Entire State.	15% of SaleValue or of Average Selling Price on advalorembasisor Rs.1,050 per m3 which is higher.	Rs.375 per MT	Rs.250 per MT
	(iii) Grey granite of DevanahalliTaluk of Bangalore Rural District and Chikkaballapurtaluk of Chikkaballapur District	15% of SaleValue or of Average Selling Price on advalorembasisor Rs.600 per m3 which is higher.	Rs.300 per MT	Rs.200 per MT
2	Felsite and its varieties suitable for use as Ornamental Stone - Entire State	15% of SaleValue or of Average Selling Price on advalorembasisor Rs.1800 per m3 which is higher.	Rs.900 per MT	
3	Quartzite and sandstone and their varieties suitable for use as Ornamental Stone - Entire State	15% of Sale Value or of Average Selling Price on advalorembasisor Rs.1800 per m3 which is higher.	Rs.900 per MT	
4	Marable and Crystalline Limestone as ornamental Stone - Entire State	15% of Sale Value or of Average Selling Price on advalorembasisor Rs.1800 per m3 which is higher.	Rs.1000 per MT	
5	Bentonite -Entire State	Rs.400 per MT	Rs.500 per MT	
6	Fuller Earth -Entire State	Rs.125 per MT	Rs.125 per MT	
7	Buff colour (waste) the permits notexceed20%of permit issued For	Rs.60 per MT	Rs.70 per MT	

	Fullers Earth		
8	Limestone under the title "Shahabad Stone"	Rs.70 per 10 Sqmeters or Rs.70 per MT	Rs.50 per 10 Sqmeters or Rs.50 per MT
9	Limestone(non -cement) when used for building stone-Entire State	Rs.25 per MT	Rs.60 per MT
10	Ordinary Building Stone(Entire State as defined under clause(g) of Rule2(1)	Rs.60 per MT	Rs.70 per MT
11	Limeshell-Entire State	100 per MT	120 per MT
12	Lime Kankar(non cement) Entire State	50 per MT	80 per MT
13	Agate, Chalcedony, Flint-Entire Stat e	240 per MT	300 per MT
14	Ordinary Sand -Entire State	60 Per MT	80 Per MT
15	Steatite and sand stone used formakinghousehold utensils / articles -Entire State.	40 Per MT	80 Per MT
16	(i)Murram (All types of soils)-Entire State	20 per MT	40 per MT
	(ii)Clay used for manufacturing tile sand bricks	40 per MT	60 per MT
17	Waste rocks generated in ornamental stone quarry - which is suitable for ornamental purpose Entire State (See explanation under Rule36)	300 per MT or 850 CUM	300perMT
18	Irregular shaped wasterock generated in Ornamental stone quarry, which is not suitable for ornamental purpose (used for making aggregates and m-sand) Entire State.	60 per MT	40 per MT
19	Waste rocks generated in Shahabad stone quarry- E ntire State (Seeexplanation under Rule-36)	60 per MT	40 per MT
20	Finished Kerb stones/cubes not exceeding 30 cms each face-Entire State.	110per MT	150 per MT

21	Barytes (i) A Grade (Grey colour (ii) B Grade (Grey colour) (iii) C, D Grade & Waste	6.5% of averageselling price or of sale value whichever ishigher on ad-valorem basis	400 per MT 300 per MT 200 per MT
22	Calcite	15% of average selling price or ofsale value whichever is higher on ad-valorem basis	80 per MT
23	China clay and Kaolin (including Ball clay, White shell, Fireclay and white clay) i) Crude/Raw ii) Processed	8% of average selling price or of sale value whichever is higheronad-valorem basis. 12% of average selling price or ofsale value whichever is higher on ad-valorem basis	80 Per MT 600 per MT
24	Corundum	12% of average sellingpriceor of sale value whichever is higher on ad-valorem basis	15% of Sale Value or of Average Selling Price on ad valorem basis which is higher.
25	Dolomite	Rs.75 per MT	100 per MT
26	Dunite and Pyroxenite	Rs. 30 per MT	60 per MT
27	Felsite (Other than for ornamental purpose)	12% of average selling price or of sale value whichever is higher on ad-valorem basis	120 per MT
28	Gypsum	20% of a verage selling price or of sale value whichever is higher on ad-valorem basis	150 per MT
29	Jasper	12% of average selling price or of sale value whichever is higher on ad-valorem basis	150 per MT
30	Quartz, feldspar	15% of average selling price or of sale value	100 per MT

		whichever is higher on ad-valorem basis	
31	Mica i. Crude ii. Waste	4% of average selling price or of sale value whichever is higher on ad-valorem basis	1500 per MT 500 per MT
32	Quartzite & Fuchsite Quartzite not suitable for use as Ornamental /Gemstones	12% of ave rage selling price or of sale value whichever is higher on ad-valorem basis	100 per MT
33	Laterite i) /dispatched for use in cement orchemical industries or Abrasive orRefractory purpose (below threshold value as specified by IBM from time to time) ii) For use as building stone (below threshold value as specified by IBM)	Rs.60 per MT	160 per MT 60 per MT
34	Ochre	Rs.24 per MT	60 per MT
35	Pyrophyllite	20% of averag e selling price or of sale value whichever is higher on ad-valorem basis	200 per MT
36	Shale	Rs.60 per MT	150 per MT
37	Slate	Rs.45 per MT	150 per MT
38	Silica Sand	10% of average selling price or of sale value whichever is higher on ad-valorem basis	100 per MT
39	Steatite or Soapstone (Other than for house hold articles)	18%of averag e selling price or of sale value whichever is higher	200perMT

		on ad-valorem basis	
	Talc	--	200perMT
40	All other minerals (which is not specified in schedule-II) Entire State	30% of sale value on ad-valorem basis	30% of Sale Value or of AverageSelling Price on ad-valorem basis which is higher.

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SECTION VII

SCHEDULE – B

MINIMUM RATES OF WAGES

ABSTRACT OF MINIMUM RATES OF WAGES FROM RELEVANT NOTIFICATIONS

MINIMUM RATES OF WAGES APPLICABLE IN THE BEAT OF ALC(C), MANGALORE WITH EFFECT FROM **01.10.2022**

Minimum Wages applicable "Construction or maintenance of roads, runways or in building operations including laying down underground electric, wireless, radio, television, telephone and overseas communication cables and similar other underground cabling work, electric lines, water supply lines and sewerage pipelines" -

Category			
	Area: A	Area:B	Area:C
Unskilled	711.00	595.00	477.00
Semiskilled/ Unskilled Supervisory	788.00	671.00	557.00
Skilled/Clerical	866.00	788.00	671.00
Highly Skilled	940.00	866.00	788.00

(Kindly Note: Area A: Bangalore (UA), Area B: Mangalore (UA), Mysore (UA), Belgaum (UA), Hubli -Dharwad, Area C: All other places in Karnataka not specified above as per Ministry of Labour and Employment F.No.1/16 (3)/2022-LS-II dated 28.09.2022)

"Employment of Sweeping and Cleaning excluding activities prohibited under the Employment of Manual Scavengers and Construction of Dry latrines (Prohibition) Act, 1933".

Area	**Rates of wages Rs.**
'A'	711.00
'B'	595.00
'C'	477.00

"Employment of Watch and Ward" -Rates of wages for employees employed in watch and ward – Govt. of India, Ministry of Labour

	Without arms	**With arms**
Area	**Rates of wages Rs.**	**Rates of wages Rs.**
'A'	866.00	940.00
'B'	788.00	866.00
'C'	671.00	788.00

For further details log on to Ministry of Employment.