



TENDER DOCUMENT
NEW MANGALORE PORT AUTHORITY
CIVIL ENGINEERING DEPARTMENT
NIT No. CIVIL/CE(C)/EE(C)/86/2023-24
E-Tender Event No.2024_NMPT_819851_1
Tender for

**“SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND
MAINTENANCE SERVICES OF CONTINUOUS AMBIENT AIR QUALITY
MONITORING (CAAQM) STATIONS AT NEW MANGALORE PORT FOR A
PERIOD OF 5 YEARS”**

THROUGH E-TENDERING MODE

Tender Amount	:	Rs.4,12,65,750/-
E.M.D.	:	Rs.9,73,900/-
Tender Fee	:	Rs.1,680/-(Including GST @ 12%)



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CIVIL ENGINEERING DEPARTMENT
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Volume - 1

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**NEW MANGALORE PORT AUTHORITY
PANAMBUR, MANGALORE -575010**

NIT No: CIVIL/CE(C)/EE(C)/86/2023-24 Date: 05-08-2024

TENDER ID: 2024_NMPT_819851_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 "Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years"

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.165.07 lakhs each**

or

At least Two similar completed works costing not less than the amount equal to **Rs.206.33 lakhs each**

or

At least One similar completed work costing not less than the amount equal to **Rs.330.13 lakhs**

Note1:*Similar work(s) means Tenderer must have supplied, tested, Successfully commissioned & maintained Air Quality Monitoring Station satisfactorily in the last 7 years.

Note 2:The ongoing works which have completed at least 3 years of operation and maintenance shall be considered for evaluation.

Note 3: 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 2020-21, 2021-22 and 2022-23 shall be at least **Rs.123.80 lakhs.**

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.

- c) The tenderer shall submit a copy of valid **ESI, EPF registration certificates** along with the tender.

Pertinent information is given in the following table:

i)	Estimated Amount put to Tender	Rs. 4,12,65,750/-
ii)	Earnest Money Deposit (EMD)	Rs.9,73,900/- (Rupees Nine Lakh SeventyThree Thousand Nine 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. The bidder shall submit "Bid Security Declaration" in the prescribed form as per Annexure 13.
iii)	Cost of Tender (Tender fee)	Rs.1,680/- (Rupees One Thousand Six Hundred Eighty 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	05-08-2024 at 15.00 HRS
v)	Seek clarification start date and time	12-08-2024 at 10.00 HRS
vi)	Seek clarification end date and time	13-08-2024 at 15.00 HRS
vii)	Bid submission start date and time	19-08-2024 at 10.00 HRS
vii)	Bid submission closing date and time	26-08-2024 at 15.00 HRS
ix)	Date & time of opening of Cover - I : Technical Part - II : Financial	27-08-2024 at 15.30 HRS Shall be communicated separately.
x)	Completion period	3 Months for Installation and there after 5 years for operation & maintenance
xi)	Validity of Tender	90 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.1680/-(Rupees One Thousand Six Hundred Eighty 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: 0824-2887306 and 0824-2407149

Email id: bhagyalaxmi.b@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)/86/2023-24**

E-TENDER EVENT NO. 2024_NMPT_819851_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
8. bidder is liable to be rejected for that tender. Bidders are allowed to enter the Bidder Name and Values only.

9. 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.
10. Bidder should arrange for the EMD and tender fee as specified in the tender. The benefit of Exemption of EMD and Tender Fees 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. Necessary document for having registered with similar category should be submitted along with Technical Bid.
11. The bidder should read the terms and conditions and accepts the same to proceed further to submit the bids.
12. 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.
13. 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.
14. 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.
15. 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.
16. The bidder may submit the bid documents online mode only, through this portal. Offline documents will not be handled through this system.
17. 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.

18. 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.
19. 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.
20. 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.
21. 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.
22. 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).
23. 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. The benefit of Exemption of EMD to all Micro and small enterprises (MSE) will be considered. The bidders 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 any other body specified by Ministry of MSME. The bidder/tenderer/contractor shall file the applicable returns with Tax departments in time and submit the same as documentary proof.
24. The bidder/tenderer/contractor shall file the applicable returns with Tax departments in time and submit the same as documentary proof.
25. The GST applicable shall be shown as a separate line item 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 or exemption certificate.
2. Scanned copy of RTGS/NEFT Payment details for EMD (bid security) / documentary evidence for exemption of EMD. The original document to be submitted by post or by hand immediately after the closing date for submission of online e-tender)
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. The tenderer shall attach Scanned copy of Pre-contract, Integrity Pact agreement executed as per Appendix II the Original copy to be submitted by post or by hand so as to reach the Executive Engineer (Civil) immediately after closing date for submission of online tender
5. Scanned copy of valid Pan card, EPF, ESI and GST Registration certificate.
6. List of Ongoing works in hand at NMPA should be indicated in the prescribed form
7. Scanned copy of Form of Tender as per Section VI(iii) of volume -III
8. 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. The Bidder shall fill in the percentage of Excess or Less in the Bill of Quantities through CPP e-portal 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 “Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years”

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 due date 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 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.165.07 lakhs each**

or

At least Two similar completed works costing not less than the amount equal to **Rs.206.33 lakhs each**

or

At least One similar completed work costing not less than the amount equal to **Rs.330.13 lakhs**

Note1:*Similar work(s) means Tenderer must have supplied, tested, Successfully commissioned & maintained Air Quality Monitoring Station satisfactorily within the in last 7 years.

Note 2: The ongoing works which have completed at least 3 years of operation and maintenance shall be considered for evaluation.

Note 3: 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 2020-21, 2021-22 and 2022-23 shall be at least Rs.123.80lakhs. 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.
- c) The tenderer shall submit a copy of valid ESI, EPF registration certificates along with the tender.

Average turnover for 3 years is the financial capacity or construction will be 3.00cr (3x3.33) i.e. 10.0crores. 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. Work completion certificate issued by a private organization shall be considered, only if Tax Deducted at Source Certificate with respect to referred work, issued by Competent Authority is enclosed along with the tender. In case work executed on subcontract, only approved or authorized subcontract shall be considered for eligible assignment.

A statement duly certified by the Chartered accountant showing the average annual Financial Turnover over the last 3 financial years with UDIN 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 (90 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 Bank Guarantee as per Annexure 9 or shall be paid by RTGS/NEFT in favour of Financial Adviser & Chief Accounts Officer, New Mangalore Port Authority, Mangalore NMPA Bank Details:-

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.

The Techno Commercial Bid shall be accompanied by the Bank Guarantee or RTGS/NEFT deposit details towards Earnest Money Deposit of Rs.973900/- (Rupees Nine Lakh SeventyThree Thousand Nine Hundred Only) as stipulated in the tender. The tender without EMD shall be treated invalid. 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.

- ii. In the event of Bidder withdrawing his Bid before the expiry of tender validity period 90 days from the last date for online bid submission, the tender shall be cancelled and EMD shall be forfeited.
- iii. The Earnest Money Deposit of unsuccessful bidder shall be returned without interest 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.

- iv. The Bid Security of a successful bidder will be forfeited in the following cases:
 - v. If the bidder withdraws his Tender during the period of bid validity.
 - vi. 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.

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.973900/- (Rupees Nine Lakh SeventyThree Thousand Nine 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: Rs.1680/-(Rupees One Thousand Six Hundred Eighty Only) (To be paid by RTGS/NEFT to NMPA Bank Account).

- iv) List of Ongoing works in hand at NMPA should be indicated in the prescribed form.
- II. FINANCIAL BID: shall contain only the Price. The Bidder shall fill in the percentage of Excess or Less in the Bill of Quantities
- 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). However, such Power of Attorney would not be required if the Application is signed by an authorized partner or Director (on the Board of Directors) of the Applicant, in case the Applicant is a Partnership firm or limited liability partnership.
 - 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.
 - iii) 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.
 - 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 be made available.
- h) 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.
- i) NEFT Payment details towards cost of tender.
- j) RTGS/NEFT Payment details towards EMD / documentary evidence of exemption of EMD.
- k) The tenderer shall attach Scanned copy of Pre-contract, Integrity Pact agreement executed as per Appendix II. The Original copy to be submitted by post or by hand so as to reach the Executive Engineer (Civil) immediately after closing date for submission of online tender.
- l) 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.

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 tenderer should ensure that their tender is received online at NMPA before the deadline prescribed in Clause 20

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 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 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. 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
- 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. Employer reserves the right to reject any Bid, if the Bidder does not provide the clarification sought for by the Employer, within the time specified by the Employer, for proper evaluation of the 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

- i. which affects in any substantial way the scope, quality or performance of the Works;
- ii. which limits in any substantial way, the Employer's rights or the Bidder's obligations under the Contract; or
- iii. 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 33.

- 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 will furnish the performance security and sign the Agreement with the Employer. The contractor shall make 20 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 (in case of BG) or refunded without interest 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.

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 Insurance Surety Bonds, Account Payee Demand draft, Fixed Deposit Receipt from a commercial bank, remittance by RTGS or Bank Guarantee (BG) or for an amount equivalent to 5% 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 and cashable at Mangalore. The BG shall be issued in favor of FA&CAO, 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;

(b) "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;

(c) "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
- (d) “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 14, to that effect, failing which, the bid may be liable for cancellation.

ANNEXURE – 1**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: “Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years”

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 UTR No.....dtd. of (name and address of the branch).
- xii. Pre-Integrity pact agreement executed as per Appendix II
- xiii. Copy of valid ESI, PF & GST Registration certificate.

Signature
(Authorised Signatory)

ON STAMP PAPER of Rs.500/-

“SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND MAINTENANCE SERVICES OF CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM) STATIONS AT NEW MANGALORE PORT FOR A PERIOD OF 5 YEARS”

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)

Note: i) The PoA has to be duly authenticated by Notary Public.

iii) Please strike off whichever is not applicable.

“SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND MAINTENANCE SERVICES OF CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM) STATIONS AT NEW MANGALORE PORT FOR A PERIOD OF 5 YEARS”

--

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 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)

NEW MANGALORE PORT AUTHORITY
“SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND MAINTENANCE
SERVICES OF CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM)
STATIONS AT NEW MANGALORE PORT FOR A PERIOD OF 5 YEARS”

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	

Signature
(Authorised Signatory)

Certificate from the Statutory Auditor

This is to certify that the information contained in SI. No 4 above is correct as per the accounts of the Applicant and/ or the clients.

(Signature, name and designation of the authorised signatory)

Date: Name and seal of the audit firm:

In case the Applicant does not have a statutory auditor, it shall provide the certificate from its chartered accountant that ordinarily audits the annual accounts of the Applicant.

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.

NEW MANGALORE PORT AUTHORITY
 “SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND MAINTENANCE
 SERVICES OF CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM)
 STATIONS AT NEW MANGALORE PORT FOR A PERIOD OF 5 YEARS”

FINANCIAL CAPABILITY

(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 Chartered 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)

NEW MANGALORE PORT AUTHORITY
 “SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND MAINTENANCE
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 STATIONS AT NEW MANGALORE PORT FOR A PERIOD OF 5 YEARS”

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

NEW MANGALORE PORT AUTHORITY (NA)

“SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND MAINTENANCE SERVICES OF CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM) STATIONS AT NEW MANGALORE PORT FOR A PERIOD OF 5 YEARS”

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)

NEW MANGALORE PORT AUTHORITY
“SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND MAINTENANCE
SERVICES OF CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM)
STATIONS AT NEW MANGALORE PORT FOR A PERIOD OF 5 YEARS”

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 Contractor'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.
- 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)**

WHEREAS, _____ [Name of Bidder] (hereinafter called "the Bidder") has submitted his bid dated _____ [date] for the Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years (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 _____ i* 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 _____ ii* 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]

i *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.

ii *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

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 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:

BID SECURITY DECLARATION FORM

Date: [insert date (as day, month and year)]

Bid No.: [insert number of bidding process]

To: [insert complete name of the Employer]

I/We. The undersigned, declare that:

I/We understand that, according to your conditions, bids must be supported by a Bid security declaration

I/We accept that we will automatically be disqualified from bidding for any contract with New Mangalore Port Trust for a period of 2 (Two) years starting from the date of notification from the Employer, if the undertaking of the affidavit submitted by us or our constituents in pursuance to any of the declarations of Letter of Technical Bid or Letter of Price Bid submitted by us are found to be false at any stage during the process of bid evaluation; or

I am / We are in a breach of any obligation(s) under the bid conditions, because I/We

- a) have withdrawn / modified / amended, impairs or derogates from the bid, my / our Bid during the period of bid validity specified in the form of Bid; or
- b) do not accept the correction of errors in accordance with the Instructions to Bidders; or
- c) having been notified of the acceptance of our Bid by the employer during the period of bid validity,
 - i. fail or refuse to execute the contract, if required; or
 - ii. fail or refuse to furnish the Performance Security, in accordance with the Instructions to Bidders; or
 - iii. fail or refuse to furnish a domestic preference security, if required.

I/We understand this Bid Security Declaration shall cease to be valid if I am/we are not the successful Bidder, upon the earlier of

i. the receipt of your notification of the name of the successful Bidder; or

ii. 28 (Twenty eight) days after the expiration of the validity of my/our Bid

Signed: [insert signature of person whose name and capacity are shown]

In the capacity of [insert legal capacity of person signing the Bid-Securing Declaration]

Name: [insert complete name of person signing the Bid-security Declaration]

Duly authorized to sign the bid for and behalf of [insert complete name of the Bidder]

Dated on _____ day of _____, _____ [insert date of

Signing]

Corporate seal [where appropriate]

Annexure-14

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 :

iii) 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

iv) 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 20 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 authorized 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.

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 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 75% of bill amount shall be paid within 14 days of submission of the bill. Balance amount of the verified bill shall be paid within 28 days of the submission of the bill.

- 43.3 Contractor shall submit final Bill within 60 days of issue of defects liability certificate. Client's Engineer or his nominee shall check the bill within 60 days after its receipt and return the bill to Contractor for corrections, if any. 50% of undisputed amount shall be paid to the Contractor at the stage of returning the bill.
- 43.4 The contractor should re-submit the bill, with corrections within 30 days of its return by the Engineer or his nominee. The re-submitted bill shall be checked and paid within 60 days of its receipt.
- 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 from 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 the 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)

47.1 Contract price shall be adjusted for increase or decrease in rates and prices of labour, materials, fuels and lubricants in accordance with the following principles and procedures and as per formula given below:

- (a) The price adjustment shall apply for the work done from the start date given in the contract data up to end of the initial intended completion date or extensions granted by the Engineer or his nominee and shall not apply to the work carried beyond the stipulated time for reason attributable to the contractor.
- (b) The price adjustment shall be determined during each quarter from the mutually agreed formula given in the contract data based on the following premises.

I (A) Formula for Labour Component

V1	=	0.85	x	(R-C)	x	K1	x	I - I0
						100		I0

Where V1 = Amount of variation payable for a value R of work done.

R = Value of work done during the period under consideration.

C = Cost of Cement & steel calculated on star rates for quantity as per design, incorporated in to the work during the period under consideration to be taken from II A and II B.

K1 = Percentage of Labour Component to be taken as 25%.

I0 = Basic Consumer Price Index for Bangalore Centre (Base 2001 = 100) for industrial workers declared as per the Labour Bureau, Ministry of Labour & Employment, Government of India as prevailing on the Base Date (28 days prior to the latest date for submission of the Bid).

I = Average Consumer Price Index for Bangalore Centre (Base 2001 = 100) for industrial workers declared by the Labour Bureau, Ministry of Labour & Employment, Government of India for the period in which the value R of work is done. If the period covered by a bill does not coincide with a calendar month, then weighted time average for the period will be taken for I.

I (B) Formula for Balance Material Component (excluding cement, steel).

V2	=	0.85	x	(R-C)	x	K2	x	M – M0
						100		M0

Where V2 = Amount of variation payable for a value R of work done on account of material.

R = Value of work done during the period under consideration.

C = Cost of Cement and steel at Star rate calculated on star rates for quantity as per design, incorporated in to the work during the period under consideration to be taken from II A and II B.

K2 = Percentage of Material Component to be taken as 70%.

M0 = Wholesale price index for all commodities prepared by the office of Economic Advisor, Ministry of Industry, Government of India as prevailing on the Base Date (28 days prior to the latest date for submission of the Bid).

M = Average wholesale price index for all commodities prepared by the office of Economic Advisor, Ministry of Industry, Government of India, during the period under consideration. If the period covered by a bill does not coincide with a calendar month, then weighted time average for the period will be taken for M.

I (C) Formula for Petrol, Oil and Lubricant (POL) Component

V3	=	0.85	x	(R-C)	x	K3	x	P – P0
						100		P0

Where V3 = Amount of variation payable for a value R of work done on account of POL component.

R = Value of work done during the period under consideration.

C = Cost of Cement & steel calculated on star rates for quantity as per design/specification, incorporated in to the work during the period under consideration to be taken from II A and II B .

K3 = Percentage of POL Component to be taken as 5%.

P0 = The price (average of the prices declared by IOC/HPCL/BPCL) of HSD for Mangalore on the Base Date (28 days prior to the latest date for submission of the Bid).

P = Average Price (average of the prices declared by IOC/HPCL/BPCL) of HSD-RSP (Rs/litre) for Mangalore during the period under consideration.

After removal of actual cost of cement & steel for B above, price adjustment for the cost of cement and steel will be made as follows:

Price Adjustment

(II) (A) For Cement

P_c	$=$	R_c	\times	Q_{cc}	\times	$\frac{I_c - I_{0c}}{I_{0c}}$
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Where P_c = Price adjustment for cement

R_c = Rate per MT of cement prevailing on the Base Date (28 days prior to the latest date for submission of the Bid) i.e. Star Rate.

I_c = Average Index for cement published by the Reserve Bank of India (source: office of the economic advisor, Ministry of commerce & Industry Government of India) under "Index numbers of Wholesale Prices by Group and Sub-Groups (Monthly data) under Group (1) – Non Metallic Mineral Products Sub-Group (C) – Cement and Lime," or Monthly whole sale price index published by the office of economic advisor, government of India under cement & Lime forming the base forming the base of calculation for index of wholesale prices during the period under consideration.

I_{0c} = Index for cement published by the Reserve Bank of India (source: office of the economic advisor, Ministry of commerce & Industry Government of India) under Index numbers of Wholesale Prices by Group and Sub-Group (Monthly data) under Group (1) – Non Metallic Mineral Products Sub-Group (C) – Cement & Lime or Monthly whole sale price index published by the office of economic advisor, government of India under cement & Lime forming the base of calculation for index of wholesale prices on the date 28 days preceding the latest date prescribed for the receipt of the Bid.

Q_{cc} = Quantity in MT of cement as per design incorporated in to the work during the period under consideration.

II (B) For Steel

P_s	$=$	R_s	\times	Q_{sc}	\times	$\frac{I_s - I_{0s}}{I_{0s}}$
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Where P_s = Price adjustment for steel

R_s = Rate per MT of steel prevailing on the Base Date (28 days prior to the latest date for submission of the Bid). i.e. Star rate.

I_s = Average Index for iron and steel published by the Reserve Bank of India (source: office of the economic advisor, Ministry of commerce & Industry Government of India) under "Index numbers of Wholesale Prices by Group and Sub-Groups (Monthly data) under Group (J) – Basic Metals, Alloys & Metal Products, Sub-Group (a) Ferrous metals – (a1) Iron & Semis" or Monthly whole sale price index published

by the office of economic advisor, government of India under Iron & Semis forming the base of calculation for index of wholesale prices during the period under consideration.

- a. Ios = Average Index for Iron and Steel published by the Reserve Bank of India (source: office of the economic advisor, Ministry of commerce & Industry Government of India) under "Index numbers of Wholesale Prices by Group and Sub-Groups (Monthly data) under Group (J) – Basic Metals, Alloys & Metal Products, Sub-Group (a) Ferrous metals – (a1) Iron & Semis" or Monthly whole sale price index published by the office of economic advisor, government of India under Iron & Semis forming the base forming the base of calculation for index of prices on the date 28 days preceding the latest date prescribed for the receipt of the Bid.

Qsc = Quantity in MT of steel as per design incorporated in to the work during the period under consideration.

Notes:

- (i) The quantities of cement and steel considered for working out price variation shall be certified by the Engineer based on approved designs and as consumed in the work excluding wastage.
 - (ii) The time for completion of the contract shall mean the period commencing from the date of the commencement of the contract and ending on the date when the time allowed for the work specified expires, taking into consideration the extension of time, if any, for completion of the work granted by the Engineer under the relevant clause or the conditions of contract in cases other than those where such extension is necessitated on account of default of the contractor. The decision of the Engineer as regards the time of completion of the contract shall be final, conclusive and binding on the contractor, where compensation for delay is levied on the contractor on account of delay in completion or inadequate progress under the relevant contract provision the escalation amount for the balance work from the date of levy of such compensation shall be worked out as follows:
Indices I, M, P, Ic, & Is will be pegged to the levels corresponding to the date from which such compensation for delay is levied.
- b. Pegged indices as well as actual indices prevailing at the time of calculation of escalation for the period under consideration will be compared and lower of the two will be taken for calculating actual escalation amount.
- (iii) Price variation shall be calculated in accordance with the formulae

mentioned at (I)(A)(B) above, separately for labour, material and POL components, as well as for price adjustment for cement and steel in accordance with formulae mentioned at (II) (A) and(B) above. The relevant websites for ascertaining the various indices are as follows:

<http://www.iocl.com/Products/HighSpeedDiesel.aspx>

http://rbidocs.rbi.org.in/rdocs/Bulletin/PDFs/38T_BUL110610.pdf

<http://labourbureau.gov.in/indtab.pdf>[http://indiabudget.nic.in/es2006-](http://indiabudget.nic.in/es2006-07/chapt2007/tab53.pdf)

[07/chapt2007/tab53.pdf](http://labourbureau.gov.in/indtab.pdf) <http://www.eaindustry.nic.in/default.html>

<http://labourbureau.nic.in/indnum.htm>

- (iv) The price variation under clause 47.1 shall not be payable for the extra items required to be executed during the progress of the work and where the rates payable for the extra items have been fixed as per the current market rates provided under Clause of General Conditions of Contract or mutually agreed.
- (v) The clause No.47.1 is operative both ways, i.e. if the price variation in the said Wholesale Price Index for all commodities, Consumer Price Index (New Series) or price of HSD of Bangalore or cost of cement or steel or bitumen is on the plus side, payment on account of the price variation shall be allowed to the Contractor and if it is on the negative side, the NMPA shall be entitled to recover the same from the contractor and the amount shall be deductible from the Contractor's bill for the respective period in which there are fluctuation.
- (vi) In order to facilitate computation of price variation to be made under clause 47.1 the contractor shall keep such books of accounts and other documents as are necessary. The contractor shall allow inspection of the same by an Engineer or his nominee and shall at the request of the Engineer may require true copies of any document so kept and such other information as the Engineer may require for verification.
- (vii) Calculation of Price Variation and Price Adjustment amount at the time of preparation of interim and final bill will be based on confirm indices and the prices of the POL products and bitumen products declared by IOC/BPCL/HPCL.
- (viii) Save and except for what is provided in the foregoing clause, nothing herein shall be construed to entitle the contractor to reimbursement of any increase in the price of materials or in the wages of labour occurring at any time and for any reason whatsoever, including the imposition of any

tax, duty or fee or an increase in the price of any petroleum product, coal, electricity or water effected by or under the order of the Central Government of a State Government.

- (ix) The basic price (star rate) will be fixed as per the prevailing rate at the time of invitation of the tender before 28 days from date of submission of the tenders.
- (x) The mobilization and de-mobilization shall not be considered for calculation of Price Variations and the price variation for the items quoted on Lump sum basis shall not be payable .

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

47.3 Subsequent Legislation

If, after the date 28 (Twenty eight) days prior to the date for submission of tenders for the contract there occur changes to any National or Statute Stature, Ordinance or Decree or other Law or any regulation or bye law of any local or other duly constituted authority or introduction of any such state statute, Ordinance, Decree, Law, regulation or bye law which causes additional or reduced cost to the contractor in execution of the contract, such additional or reduced cost shall, after due consultation with the Employer and the contractor be determined by the Engineer or his nominee and shall be added to or deducted from the contract price and the Engineer or his nominee shall notify the contractor accordingly with a copy to the Employer.

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% from first Running Bill onwards subject to a max. of 5% of the contract price including GST. Retention money shall be refunded after completion of defect liability period along with performance security.

49. Liquidated Damages (Applicable for Supply & Installation)

- 49A In case of delay in completion of the contract, liquidated damages (L.D) may be levied at the rate of half per cent ($\frac{1}{2}\%$) 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 ($\frac{1}{2}\%$) of the contract value of the works 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 guaranty 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 Mobilization Advance shall be paid up to 10% of Contract price, payable in two equal installments. The first installment shall be paid after mobilization 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 Mobilization 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 Mobilization 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 utilization of earlier advance (s).
- 51.5 Recovery of Mobilization 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 10% of the contract amount including GST, of which 5% of contract price should be submitted as Performance Security 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)

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'.

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.

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'(NA)

"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 anything 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.

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 Contractor'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. 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 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 Statutes, Ordinances and Government Regulations or Orders for the time being in force, import, sell, give, barter or otherwise dispose of any alcoholic liquor, or drugs or permit or suffer any such importation, sale, 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 depending upon the location. 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, labours and the staffs engaged in the works. The Contractor has to get the vehicle and labour 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.

The entry and exit of construction equipment, Plants, construction materials etc., into the Port premises is also regulated by Gate passes. These gate passes will be issued by the Engineer and the Contractor shall produce the same at the security Gate during the entry and exit of the materials. The duplicate copy of the inward pass shall be retained by the Contractor and shall be produced at the Gate during the exit of the materials along with the outward gate pass.

72. Life Saving Appliances and First Aid

The Contractor shall provide and maintain upon the Works sufficient proper and efficient lifesaving 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.

The bidders shall disclose any payments made or proposed to be made to any intermediaries (agents etc) in connection with the bid.

The bidder shall execute Integrity Pact Agreement with NMPA as per the Integrity Pact Agreement Appendix II. The following Independent External Monitor (IEM) is nominated.

Ms. Sunita Puri, IRS(Retd.)

H No.2095

Sector 15 C

Chandigarh-560102

Mob No.9872099717

E-mail ID : sunita.puri15@gmail.com

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.

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

75.1 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.

75.2 Submission of Reports, Returns, etc.

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.

76. 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 the prevailing rate notified 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.

77. 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 with applicable demand charges and security deposit 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 before availing the power supply.

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.

78. 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.

79. Price Adjustment (not applicable to this contract)

The following clause shall be read in continuation to clause no. 47 of GCC. The sanction towards the compensation for escalation or deduction on account of de-escalation and the amount thus sanctioned will be included in the next running

account bill or final bill as the case may be. The cost of work for which escalation/de-escalation is applicable / deductible shall be worked out as per cl. 32.8.6.1., CPWD works manual, 2003.

The cost of work for which escalation/de-escalation is applicable / deductible shall be worked out as below:

- (a) Gross value of work done up to this quarter (A)
- (b) Gross value of work done up to the last quarter (B)
- (c) Gross value of work done since previous quarter (a) – (b) (C)
- (d) Full assessed value of SA fresh paid in this quarter (D)
- (e) Full assessed value of SA recovered in this quarter (E)
- (f) Full assessed value of SA for which escalation is payable in this quarter
(d) – (e) (F)
- (g) Advance payment made during the quarter (G)
- (h) Advance payment recovered during the quarter (H)
- (i) Advance payment for which escalation is payable in this quarter (g)– (h) (I)
- (j) EI paid based on prevailing M/R during the quarter (J)

$$X = C \pm F \pm I - J$$

$$Y = 0.85 X$$

- (k) Less cost of materials supplied by the department & recovered during the quarter (K)
- (l) Less cost of services tendered at fixed charges & recovered during the quarter (L)
- (m) Cost of work for which escalation/de-escalation is applicable $W = Y - (K + L)$

80. 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.

81. 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 not 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 as 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.

82. 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.

83. 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.

84. 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, equipment's and plant to storage go-downs, 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.*

85. 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 carry out 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 addition 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 case 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.

86. Monsoon Period

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

87. 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:

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, Photographs in hardcopy & digital copy and videography in two sets showing the various stages of progress on the Site monthly;

For the supply of manufactured items, the name of the manufacturer, manufacture location, percentage progress, and the actual or expected dates of:

Commencement of manufacture,

Contractor's/Engineer's inspections,

Tests,

Shipment and arrival at the Site;

Copies of quality assurance documents, test results and certificates of Materials;

Safety statistics, including details of any hazardous incidents and activities relating to environmental aspects and public relations; and

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.

88. Completion Documents

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:

The Technical documents according to which the work was carried out. Certificates of final levels and dimensions as set out for various works. Certificates of tests performed for various works.

89. Facilities / Services to be provided at the site (Not Applicable)

After the issue of Engineer's notice to commence, the Contractor shall as soon as possible, make available of the following facilities for the staff of the Engineer at the Site of Work, all to the approval of the Engineer or his Representative and the Contract Price shall be deemed to be inclusive of the provision for these facilities:

Provide and maintain, throughout the period of Contract, one no of Office

accommodation at site office / Porta cabin measuring not less than 4m x 5m. each, with electricity and water supply and adequate ventilation for the sole use of Engineer's Representative, his staff.

Provide and maintain suitable furniture for the office, including: Tables with two lockable drawers and chairs, Almirah with shelves and necessary electrical fittings.

Provide and maintain, throughout the period of Contract, a Toilet along with washroom facilities with electricity and water supply and adequate ventilation for the sole use of Engineer's Representative, his staff.

Desk top Computers of latest configuration with printers and all other necessary accessories, internet and loaded with the latest version of software like M.S. Office, AutoCAD etc. with windows operating system.

One photocopying machine capable of Black & White copying / Scanning A4 & A3 size of paper, with auto feed of papers (Source to be copied) along with sorting facilities.

The contractor shall make available during the currency of contract all the Survey instruments and various measuring devices necessary for the execution of the project.

A lock and four (4) keys for the office room. There shall be no spare keys in the possession of any person other than Engineer's Representative.

90. Payments

The Clause No. 43 payments shall be replaced as follows

- i. 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 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.

- ii. Interim of bill amount will be paid within 14 days of submission of the bill.
- iii. 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
- iv. The payment will be made to the contractor after deducting any dues payable to the Port statutory authorities etc
- v. 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.
- vi. 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.

91. Retention

The Clause No. 48 Retention shall be replaced as follows

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.

Retention Money shall be deducted at 10% from Running Bills subject to a max. of 5% of the contract price plus Goods Service tax applicable. Retention money shall be refunded after issue of No defects certificate.

92. 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 @ 13.61% and 12% 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. 3,500/- per month or less. The bonus to be paid to employees getting Rs. 2,500/- per month or above up to Rs. 3,500/- per month shall be worked out by taking wages as Rs. 2,500/- 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.

v) 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 : Chairperson 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 C-II Civil Engineering Department, NMPA, Panambur, Mangalore- 575010	
5	The name and identification number of the Contract is	
	Name of Contract:- "Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years" Tender no: CIVIL/CE(C)/EE(C)/86/2023-24	(1)

Sl. No.	Description	Reference Cl. No.		
6	The works consist of Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years.	(1)		
7	Schedule date of commencement 14 days from the date of Issue of Letter of Acceptance. However No work shall be commenced before signing of contract Agreement.	Conditions of contract A-General 1.Definitions 59.2(a)		
8	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.	1.Definitions		
9	The Intended completion Date for the whole of the Work is 3 Months for Installation and there after 5 years for operation & maintenance with the following milestones:	(17,28)		
10	Milestone dates: <table border="1"> <tr> <td>Physical works to be completed</td> <td>Period from the date of commencement of work</td> </tr> </table> 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.	Physical works to be completed	Period from the date of commencement of work	(27)
Physical works to be completed	Period from the date of commencement of work			
11	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	(2.3)		

Sl. No.	Description	Reference Cl. No.
	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).	
12	The Contractor shall submit a Program for the Works within 14 days of delivery of the letter of Acceptance.	(27)
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 located at Panambur in NMP area and is defined in drawing as location plan	
15	The Defects Liability Period is 1 year from the date of commissioning 1(one) year	(35)
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.	(13)
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)

Sl. No.	Description	Reference Cl. No.
24	Fees and types of reimbursable expenses to be paid to the Dispute Review Board as per actual and equally shared by both the parties.	(25)
25	The Dispute Review Board shall be constituted after signing of the agreement on mutually agreed terms.(Appendix 1). (Not applicable to this contract)	(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 running bill subject to a maximum of 5% of the contract price including GST as applicable.	(48)
28	The maximum amount of liquidated damages applicable for Any delay in supply and installation 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 in the form of Insurance Surety Bonds, Account Payee Demand draft, Fixed Deposit Receipt from a commercial bank, remittance by RTGS or in the form of Bank Guarantee for 5% 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
35	The Contractor has to submit the final claim for reimbursement of ESI and EPF contribution on the part of the employer in respect of this contract within 60 days from the date of completion of work.	(71)

vi) 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.

BANK GUARANTEE FOR ADVANCE PAYMENT

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.....(Rupeesonly) 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 thisday 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.

**TO GENERAL CONDITIONS OF CONTRACT (NA)
DISPUTES REVIEW BOARD AGREEMENT**

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:

The parties agree to the establishment and operation of the Board in accordance with
this Board Agreement.

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.

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.

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. 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.

Board Member shall not assign or subcontract any of their work under this Agreement.

The Board Members are independent and not employees or agents of either the Employer or the Contractor.

The Board Members are absolved of any personal or professional liability arising from the activities and the Recommendations of the Board.

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.

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 Member 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 utilised 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. After the hearings 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.

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 be 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.

**TO SPECIAL CONDITIONS OF CONTRACT
PRE CONTRACT INTEGRITY PACT AGREEMENT**

General

This pre-bid pre-contract Agreement (hereinafter called the Integrity Pact) is made on _____ day of the month of _____ 20___, between, on one hand, the Board of Members of New Mangalore Port Authority acting through _____, Chief Engineer (Civil), (Name & Designation of the Officer) New Mangalore Port Authority (hereinafter called the 'BUYER/EMPLOYER', which expression shall mean and include, unless the context otherwise requires, his successors in office and assigns) of the First Part and M/s _____ represented by Shri _____, Chief Executive Officer (hereinafter called the 'BIDDER' which expression shall mean and include, unless the context otherwise requires, his successors and permitted assigns) of the Second Part.

WHEREAS the 'BUYER/EMPLOYER' has invited bids for Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years and the BIDDER is submitting his bid for the same and

WHEREAS the BIDDER is a Private company / Public company / Government undertaking / registered partnership firm, constituted in accordance with the relevant law in the matter and the 'BUYER/EMPLOYER' is New Mangalore Port Authority.

NOW, THEREFORE,

To avoid all forms of corruption by following a system that is fair, transparent and free from any influence/prejudiced dealings prior to, during and subsequent to the currency of the contract to be entered into with a view to:-

Enabling the 'BUYER/EMPLOYER' to obtain the desired said stores/equipment/services/works at a competitive price in conformity with the defined specifications by avoiding the high cost and the distortionary impact of corruption on public procurement, and

Enabling BIDDERS to abstain from bribing or indulging in any corrupt practice in order to secure the contract by providing assurance to them that their competitors will also abstain from bribing and other corrupt practices and the 'BUYER/EMPLOYER' will commit to prevent corruption, in any form, by its officials by following transparent procedures.

The parties hereto hereby agree to enter into this Integrity Pact and agree as follows:

Commitments of the 'BUYER/ EMPLOYER'

- 1.1 The 'BUYER/EMPLOYER' undertakes that no official of the 'BUYER/EMPLOYER', connected directly or indirectly with the contract, will demand, take a promise for or accept, directly or through intermediaries, any bribe, consideration, gift, reward, favour or any material or immaterial benefit or any other advantage from the BIDDER, either for themselves or for any person, organization or third party related to the contract in exchange for an advantage in the bidding process, bid evaluation, contracting or implementation process related to the contract.
 - 1.2 The 'BUYER/EMPLOYER' will, during the pre-contract stage, treat all BIDDERS alike and will provide to all BIDDERS the same information and will not provide any such information to any particular BIDDER which could afford an advantage to that particular BIDDER in comparison to other BIDDERS.
 - 1.3 All the officials of the 'BUYER/EMPLOYER' will report to the appropriate Government office any attempted or completed breaches of the above commitments as well as any substantial suspicion of such a breach.
2. In case any such preceding misconduct on the part of such official(s) is reported by the BIDDER to the 'BUYER/ EMPLOYER' with full and verifiable facts and the same is prima facie found to be correct by the 'BUYER/EMPLOYER' necessary disciplinary proceedings, or any other action as deemed fit, including criminal proceedings may be initiated by the 'BUYER/ EMPLOYER' and such a person shall be debarred from further dealings related-to the contract process. In such a case while an enquiry is being conducted by the 'BUYER/ EMPLOYER' the proceedings under the contract would not be stalled.

Commitments of BIDDERS

3. The BIDDER commits itself to take all measures necessary to prevent corrupt practices, unfair means and illegal activities during any stage of its bid or during any pre-contract or post-contract stage in order to secure the contract or in furtherance to secure it and in particular commit itself to the following.:-
 - 3.1. The BIDDER will not offer, directly or through intermediaries, any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the 'BUYER/EMPLOYER' connected directly or indirectly with the bidding process, or to any person, organization or third party related to the contract in exchange for any advantage in the bidding, evaluation, contracting and implementation of the contract.

- 3.2. The BIDDER further undertakes that it has not given, offered or promised to give, directly or indirectly any bribe, gift, consideration, reward, favour, any material or immaterial benefit or other advantage, commission, fees, brokerage or inducement to any official of the 'BUYER/EMPLOYER' or otherwise in procuring the Contract or forbearing to do or having done any act in relation to the obtaining or execution of the contract or any other contract with the Government for showing or forbearing to show favour or disfavour to any person in relation to the contract or any other contract with the Government.
- 3.3. BIDDERS shall disclose the name and address of agents and representatives and Indian BIDDERS shall disclose their foreign principals or associates.
- 3.4. BIDDERS shall disclose the payments to be made by them to agents/brokers or any other intermediary, in connection with this bid/contract.
- 3.5. The BIDDER further confirms and declares to the 'BUYER/EMPLOYER' that the BIDDER has not engaged any individual or firm or company whether Indian or foreign to intercede, facilitate or in any way to recommend to the 'BUYER/EMPLOYER' or any of its functionaries, whether officially or unofficially to the award of the contract to the BIDDER, nor has any amount been paid, promised or intended to be paid to any such individual, firm or company in respect of any such intercession, facilitation or recommendation.
- 3.6. The BIDDER, either while presenting the bid or during pre-contract negotiations or before signing the contract, shall disclose any payments he has made, is committed to or intends to make to officials of the 'BUYER/EMPLOYER' or their family members, agents, brokers or any other intermediaries in connection with the contract and the details of services agreed upon for such payments.
- 3.7. The BIDDER will not collude with other parties interested in the contract to impair the transparency, fairness and progress of the bidding process, bid evaluation, contracting and implementation of the contract.
- 3.8. The BIDDER will not accept any advantage in exchange for any corrupt practice, unfair means and illegal activities.
- 3.9. The BIDDER shall not use improperly, for purposes of competition or personal gain, or pass on to others, any information provided by the 'BUYER/EMPLOYER' as part of the business relationship, regarding plans, technical proposals and business details, including information contained in any electronic data carrier. The BIDDER also undertakes to exercise due and

adequate care lest any such information is divulged.

- 3.10. The BIDDER commits to refrain from giving any complaint directly or through any other manner without supporting it with full and verifiable facts.
- 3.11. The BIDDER shall not instigate or cause to instigate any third person to commit any of the actions mentioned above.
- 3.12. If the BIDDER or any employee of the BIDDER or any person acting on behalf of the BIDDER, either directly or indirectly, is a relative of any of the officers of the 'BUYER/EMPLOYER' or alternatively, if any relative of an officer of the 'BUYER/EMPLOYER' has financial interest/stake in the BIDDER's firm, the same shall be disclosed by the BIDDER at the time of filing of tender.
The term 'relative' for this purpose would be as defined in Section 6 of the Companies Act 1956.
- 3.13. The BIDDER shall not lend to or borrow any money from or enter into any monetary dealings or transactions, directly or indirectly, with any employee of the 'BUYER/EMPLOYER'.
- 3.14. The bidder signing IP shall not approach courts while representing the matters to IEMs and he / she / they will wait their decision in the matter.

4. Previous Transgression

- 4.1 The BIDDER declares that no previous transgression occurred in the last three years immediately before signing of this Integrity Pact, with any other company in any country in respect of any corrupt practices envisaged hereunder or with any Public Sector Enterprise in India or any Government Department in India that could justify bidder's exclusion from the tender process.
- 4.2 The BIDDER agrees that if it makes incorrect statement on this subject, BIDDER can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

5. Earnest Money (Security Deposit)

- 5.1 While submitting commercial bid, the BIDDER shall deposit an amount for Rs.973900/- (Rupees Nine Lakh SeventyThree Thousand Nine Hundred Only) as Earnest Money/Security Deposit, with the 'BUYER/ EMPLOYER' through any of the following instruments:
 - i) Paid by RTGS in favour of FA and CAO, NMPA
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.

- 5.2 The Earnest Money/Security Deposit shall be valid up to a period of 148 days or the complete conclusion of the contractual obligations to the complete satisfaction of both the BIDDER and the 'BUYER/EMPLOYER', including warranty period, whichever is later.
- 5.3 In case of the successful BIDDER, a clause would also be incorporated in the Article pertaining to Performance Security in the Project Contract that the provisions of Sanctions for Violation shall be applicable for forfeiture of Performance Security in case of a decision by the 'BUYER/EMPLOYER' to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.
- 5.4 No interest shall be payable by the 'BUYER/EMPLOYER' to the BIDDER on Earnest Money/Security Deposit for the period of its currency.

6. Sanctions for Violations

- 6.1 Any breach of the aforesaid provisions by the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER) shall entitle the 'BUYER/EMPLOYER' to take all or any one of the following actions, wherever required:-
- i) To immediately call off the pre contract negotiations without assigning any reason or giving any compensation to the BIDDER. However, the proceedings with the other BIDDER(s) would continue.
 - ii) The Earnest Money Deposit (in pre-contract stage) and/or Security Deposit/Performance Bond (after the contract is signed) shall stand forfeited either fully or partially, as decided by the 'BUYER/EMPLOYER' and the 'BUYER/ EMPLOYER' shall not be required to assign any reason therefore.
 - iii) To immediately cancel the contract, if already signed, without giving any compensation to the BIDDER.
 - iv) To recover all sums already paid by the 'BUYER/EMPLOYER', and in case of an Indian BIDDER with interest thereon at 2% higher than the prevailing Prime Lending Rate of State Bank of India, while in case of a BIDDER from a country other than India with interest thereon at 2% higher than the LIBOR. If any outstanding payment is due to the

BIDDER from the 'BUYER/EMPLOYER' in connection with any other contract, such outstanding payment could also be utilized to recover the aforesaid sum and interest.

- v) To encash the advance bank guarantee and performance bond/warranty bond, if furnished by the BIDDER, in order to recover the payments, already made by the 'BUYER/EMPLOYER', along with interest.
 - vi) To cancel all or any other Contracts with the BIDDER. The BIDDER shall, be liable to pay compensation for any loss or damage to the 'BUYER/EMPLOYER' resulting from such cancellation/rescission and the 'BUYER/EMPLOYER' shall be entitled to deduct the amount so payable from the money(s) due to the BIDDER.
 - vii) To debar the BIDDER from participating in future bidding processes for a minimum period of five years, which may be further extended at the discretion of the 'BUYER/EMPLOYER'.
 - viii) To recover all sums paid in violation of this Pact by BIDDER(s) to any middleman or agent or broker with a view to securing the contract.
 - ix) In cases where irrevocable Letters of Credit have been received in respect of any contract signed by the 'BUYER/EMPLOYER' with the BIDDER, the same shall not be opened.
 - x) Forfeiture of Performance Guarantee in case of a decision by the 'BUYER/ EMPLOYER' to forfeit the same without assigning any reason for imposing sanction for violation of this Pact.
- 6.2 The 'BUYER/EMPLOYER' will be entitled to take all or any of the actions mentioned at para 6.1(i) to (x) of this Pact also on the Commission by the BIDDER or any one employed by it or acting on its behalf (whether with or without the knowledge of the BIDDER), of an offence as defined in Chapter IX of the Indian Penal code, 1860 or Prevention of Corruption Act, 1988 or any other statute enacted for prevention of corruption.
- 6.3 The bidder the decision of the 'BUYER/EMPLOYER' to the effect that a breach of the provisions of this Pact has been committed by the BIDDER shall be final and conclusive on the BIDDER. However, the BIDDER can approach the Independent Monitor(s) appointed for the purposes of this Pact.

7. Fall Clause

- 7.1 Undertakes that it has not performed/is not performing similar project at a price lower than that offered in the present bid in respect of any other

Ministry/Department of the Government of India or PSU and if it is found at any stage that similar project was performed by the BIDDER in any other Ministry/Department of the Government of India or a PSU at a lower price, then that very price, with due allowance for elapsed time, will be applicable to the present case and the difference in the cost would be refunded by the BIDDER to the 'BUYER/EMPLOYER', if the contract has already been concluded.

8. Independent Monitors

The 'BUYER/EMPLOYER' has appointed the following Independent Monitor (hereinafter referred to as Monitor) for this Pact in consultation with the Central Vigilance Commission Name and Address of the Monitor:

Ms. Sunita Puri, IRS (Retd.)

H No.2095

Sector 15 C,

Chandigarh-560102

Mob No. 9872099717

E-mail ID : sunita.puri15@gmail.com

- 8.1 The task of the Monitor shall be to review independently and objectively, whether and to what extent the parties comply with the obligations under this Pact.
- 8.2 The Monitor shall not be subject to instructions by the representatives of the parties and perform his functions neutrally and independently.
- 8.3 Both the parties accept that the Monitor has the right to access all the documents relating to the project/bidding, including minutes of meetings.
- 8.4 As soon as the Monitor notices, or has reason to believe, a violation of this Pact, he will so inform the Authority designated by the 'BUYER/EMPLOYER'.
- 8.5 The BIDDER(s) accepts that the Monitor has the right to access without restriction to all Project documentation of the 'BUYER/EMPLOYER', including that provided by the BIDDER. The BIDDER will also grant the Monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his project documentation. The same is applicable to Subcontractors. The Monitor shall be under contractual obligation to treat the information and documents of the BIDDER/Subcontractor(s) with confidentiality.
- 8.6 The 'BUYER/EMPLOYER', will provide to the Monitor sufficient information about all meetings among the parties related to the Project provided such meetings could have an impact on the contractual relations between the parties. The parties will offer to the Monitor the option to participate in such

meetings.

8.7 The Monitor will submit a written report to the designated Authority of 'BUYER/EMPLOYER' within 8 to 10 weeks from the date of reference or intimation to him by the BUYER / EMPLOYER / BIDDER and, should the occasion arise, submit proposals for correcting problematic situations.

9. Facilitation of Investigation

In case of any allegation of violation of any provisions of this pact or payment of commission, the 'BUYER/EMPLOYER' or its agencies shall be entitled to examine all the documents including the Books of Accounts of the BIDDER and the BIDDER shall provide necessary information and documents in English and shall extend all possible help for the purpose of such examination.

10. Law and Place of Jurisdiction

This Pact is subject to Indian Law.' The place of performance and jurisdiction is the seat of the 'BUYER/EMPLOYER'.

11. Other Legal Actions

The actions stipulated in this Integrity Pact are without prejudice to any other legal action that may follow in accordance with the provisions of the extant law in force relating to any civil or criminal proceedings.

12. Validity

12.1 The validity of this Integrity Pact shall be from date of its signing and extend up to 5 years or the complete execution of the contract to the satisfaction of both the 'BUYER/EMPLOYER' and the BIDDER, including warranty period, whichever is later. In case BIDDER is unsuccessful, this Integrity Pact shall expire after six months from the date of the signing of the contract.

12.2 Should one or several provisions of this Pact turn out to be invalid, the remainder of this Pact shall remain valid. In this case, the parties will strive to come to an agreement to their original intentions.

12.3 If the BIDDER is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

13. The parties hereby sign this Integrity Pact at _____ on _____

BUYER/EMPLOYER
Name of the Officer
and Designation

BIDDER
CHIEF EXECUTIVE OFFICER

Witness

- 1. _____
- 2. _____

Witness

- 1. _____
- 2. _____,

* Provisions of these clauses would need to be amended/ deleted in line with the policy of the BUYER/ EMPLOYER in regard to involvement of Indian agents of



**NEW MANGALORE PORT AUTHORITY
PANAMBUR, MANGALORE**

**SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND
MAINTENANCE SERVICES OF CONTINUOUS AMBIENT AIR
QUALITY MONITORING (CAAQM) STATIONS AT NEW
MANGALORE PORT FOR A PERIOD OF 5 YEARS”**

**TENDER DOCUMENT
VOLUME – II**

NEW MANGALORE PORT AUTHORITY
CIVIL ENGINEERING DEPARTMENT
TENDER NO: CIVIL/CE(C)/EE(C)/30/2023-24

TENDER FOR

“Supply, installation, commissioning operation and maintenance Services of Continuous Ambient Air Quality Monitoring (CAAQM) stations at New Mangalore Port for a period of 5 years”.

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	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
<u>Volume II</u>	Section IV	Technical Specifications
	Section V	Drawings
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MINIMUM REQUIREMENTS FOR A CAAQM STATION

The equipment's are intended for one Continuous Ambient Air Quality Monitoring (CAAQM) Station. The system should be completely functional. Any balance of material not specified but required for the purpose must be supplied by the vendors.

Sl. No.	Item / Analyzer Name	Total Quantity
1.	Monitoring Station foundations.	Actual
2.	Air Conditioner, Split Type, Wall mounted along with voltage stabilizer (2 X 2 ton, 1 X 1 Ton). at the CAAQM Station	Three
3.	On line UPS (1X10KVA, 1 hr. back up and 1X5 KVA, 2 hr. back up) at the CAAQM Station	Two
4.	Sampling System having 10 port manifold	One
5.	19" Rack cabinet to accommodate all analyzers & systems	Three
6.	Continuous Ambient Oxides of Nitrogen (NO/NO ₂ / NO _x) Analyzer	One
7.	Continuous Ambient Ammonia (NH ₃) Analyzer	One
8.	Continuous Ambient Sulphur Dioxide (SO ₂) Analyzer	One
9.	Continuous Ambient Ozone (O ₃) Analyzer	One
10.	Continuous Ambient Carbon Monoxide (CO) Analyzer	One
11.	Continuous BTEX Monitor / Analyzer	One
12.	Multi calibration System for Gas calibration and Meteorological, Flow and Electronic Calibration	One set
13.	Automatic PM _{2.5} Particulate Matter Monitor	One
14.	Automatic PM ₁₀ Particulate Matter Monitor	One
15.	Meteorological Sensors for Wind Direction, Wind Speed, Ambient Temperature, Rainfall, Relative Humidity, Solar Radiation and Telescoping Crank – up Meteorological Tower	One set
16.	IT PERIPHERLS:	
	(a) Data Acquisition System (DAS): One for each CAAQM Station	One
	(b) Computer System for DAS: One for each CAAQM Station	One
	(c) Computer System for AQI: One for each CAAQM Station	One
	(d) Laser Printer Colour MFP : One for each CAAQM Station	One
	(e) Server Rack: One for each KSPCB*	One
	(f) Rack Server: One for each KSPCB*	One
	(g) Access Point: One for each KSPCB*	One
	(h) UTM: One for each KSPCB*	One
	(i) 24Ports CISCO Switch: One for each KSPCB*	One
	(j) Central Management Software with License w.r.t. Data Acquisition: One for each KSPCB*	One
	(k) Remote Calibration & Validation Software: One for each KSPCB*	One
	(l) Remote Connectivity Tool/Software: One for each KSPCB*	One
17.	Data display Board Transmission Device (two nos) (One for Data Display Board near to the station and another for data display at the KSPCB display board*)	Two
18.	Day & Night Visible Data Display Board (Near to the station)	One
19.	Day & Night Visible Data Display Board at the respective SPCB-H.O.*	One

20.	Continuous Automatic Monitoring Stations with Sampling line, Internal fitting, Instruments racks, Electrical fittings and Gas line fittings, Tools (electrical and mechanical), Data display system, Recommended spares in a Housing Container OR Continuous Automatic Monitoring Stations with Sampling line, Internal fitting, Instruments racks, Electrical fittings and Gas line fittings, Tools (electrical and mechanical), Data display system, Recommended spares without a Housing Container	One set OR One set w/o container
21.	Lease Line for Internet AND Broadband (for Station) AND Data Card as mode Communication system (for display Board)	One set
22.	foundation, CIVIL works including Caging, civil & electrical work (for CAAQM stations as well as Data Display Boards)	Actual

I. TECHNICAL SPECIFICATIONS

1. CAAQM STATION –HOUSING/ CONTAINER

1.0 MONITORING STATION

Platform construction:	
1	Area: 20 x 20 Sq. feet with 2 ft height
2	The strength of the platform should bear the total load of the monitoring station and condition of the platform should be maintained for at least 10 years. Warranty for 10 years

1.1 Housing/Container: It is designed for housing the ambient air quality monitoring instruments to protect them from dust and heat. Temperature and Humidity sensors shall be installed in the housing for checking the humidity and temperature inside the station. Three Nos. 19" racks shall be installed inside the station so that the analyzers are easily accessible from front & back for calibration and maintenance.

1.1.1 Dimensions: Inside length: 4200 mm

Inside width: 3500 mm

Inside height: 2500 mm (As per the Drawing given)

1.1.2 Frame: All the material used for the construction of the floor, frame, roof frame etc, the 4 corner posts and 8 integrated, reinforced container corners should be of metal. The exterior panel of the container shall be made of pre-coated MS Sheet of approved colour shade. All other steel parts should be hot dipped galvanized having minimum rate of galvanization of 275 gram per square meter (**IS277**). All joints of like metal such as steel-to-steel or aluminum-to-aluminum shall be protected against corrosion by liberal application of joining compound. All joints of dissimilar metals such as steel to aluminum shall be protected against corrosion due to galvanic action by liberal application of dielectric compound as well as jointing compound on both mating surfaces. For lifting / fixing the container, International Standard eyebolts should be provided at the corners.

1.1.3 Paneling: The outer paneling will be of 1.2 mm of Pre-coated MS sheet to withstand external impacts and abrasions. Outer side of the MS Sheet i.e. exposed face of the sheet, shall be permanently colour coated with silicon modified polyester coating of dry film thickness (DFT) 20 micron (min.) of approved colour shade over primer. Inner face of the sheet shall be provided with suitable pre- coating of minimum 7 micron off-white colour. The inner paneling will be of PVC coated 2 mm thick aluminum sheet, fixed over an inlay of 4 mm marine plywood. 100 mm thick polyurethane insulation will be used between the outer and inner walls (Pre-coated MS sheet and Marine plywood) as insulating material. Z spacers if required shall be made out of at least 2 mm thick galvanized steel sheet of grade 275 as per IS:277

1.1.4 Floor: The floor will be laid in frame of 600 x 600 mm centre to centre with 50 x50 x 6 mm MS angle. The floor surface will be of 19 mm marine plywood covered with robust quality Vinyl flooring, 2 mm thick of approved colour. The floor should be of acid and alkaline resistant, waterproof, easily

cleanable / washable. Bottom plate of thickness 2 mm hot dipped galvanised MS Plate shall be provided.

1.1.5 Outer Door: One door of size 2000 x 900 mm will be provided at the front side (L = 4200 mm) of the station with isolated 3 – point locking & door handle flush fitted.

1.1.6 Electric Power Supply Box: Three - phase (3 Ø) electrical wiring will be laid in ducts. Copper wiring of appropriate gauge will be used. The terminal board should be mounted in a central power distribution box. Over voltage protection for each phase shall be provided along with the lightning arrestor. 2 numbers Emergency cut off switch & Thermostat switch (max 35°C) for power disconnection, 6 free sockets and 3 fluorescent lamps for lighting will be provided.

The station shall be properly grounded with chemical earthing or as per BIS Standards with proper plate and only copper strip at least on 2 corners (diametrically opposite). One three phase energy meter (Digital Type) shall be installed. Weatherproof cubicles / enclosure for housing of MCB / TP & N Switch of main power termination (outside shelter) and weatherproof telephone junction box for terminations of telephone line are to be provided. Proper earthing for telescopic mast of meteorological system shall be provided. There should be conduction between the telescopic mast of the meteorological system and the station. The guy ropes or wires shall be provided for supporting the mast.

List of Consumables:

All Fuses	: 02 set
Lightning arrestor	: 02 set
Emergency Switch	: 02 pcs
Thermostat	: 01 pc

1.1.7 Partitioning for Calibration Gas Cylinders, Meteorological Mast and UPS:

The housing will be partitioned as per drawing to create space for storing of gas cylinders, Meteorological mast & UPS. The size will be 2000 x 1400 x 2300 mm. A lockable door of size 900 x 2000 mm along-with 3 – Point locking system shall be provided on the outer wall of the housing. A 300 mm, single-phase (230 volts \pm 10 volts AC and 50 Hz \pm 3%) exhaust fan with safety grills will be provided. Mounting brackets in 2 levels for fixing of at-least 06 (six) gas cylinders should be provided. The internal lights of the housing should be sensor based.

Air conditioners shall be mounted on proper rust proof supporting structures with rubber blocks to avoid vibration of structures. Proper caging / grill should also be provided for the safety of ACs. Sun shades for external AC units shall be provided with fabricated pre-coated MS sheet (same as monitoring station) with supporting arrangements. AC unit's external piping shall be placed in GI trays. Cable trays fixed on exterior wall shall be covered with pre-coated MS sheet, of same colour shade of monitoring station. Roof top sheet to be levelled and sloped properly. Rain water spout shall be fixed at top with rain water down pipe at two corners. The external lights of the station should be Solar operated.

1.1.8 Station Furnishing:

- (i) 19" racks – 03 Nos.
- (ii) Fire extinguishers – 02 Nos. (Clean Agent – 2 KG each)
- (iii) Furniture:
 - a) Material - Furniture made of water resistant laminated board

- b) Cupboard – As per drawing
 - c) Working table – Powdered coated MS frame size 1400 x 900 x 750 mm (w x d x h) and top 19 mm thickness Board
 - d) Revolving tilting chair – 02 Nos.
- (iv) Miscellaneous
- a) The exhaust gases from the analyser should be collected and discharged by a common exhaust pipe and vented.
 - b) Folding aluminium ladder for roof access (Length.... with 1 feet width steps)
 - c) Sensor for measuring the inside temperature of the station and Display
 - d) Hygrometer for measurement of Humidity inside the station and Display
 - e) Mounting bracket for the ladder
 - f) No smoking stickers
 - g) Vacuum cleaner with minimum 100 watt power
 - h) Tool Kit having following tools:
 1. One screw driver set
 2. One Digital multi-meter (Philips, Micro or equivalent make)
 3. One box spanner set
 4. One D spanner set
 5. One watch maker set
 6. One Hammer set
 7. One precision screw driver set
 8. One pliers set
 9. One Tong tester
 10. One Soldering Iron with stand
 - i) One Emergency LED Cluster light
 - j) Sign boards along-with logo of Central Pollution Control Board, Delhi / State Pollution Control Board, to be embedded with size 1500 x 900 mm on the front of the container and on the two side of the container, The name of the Station i.e. Continuous Ambient Air Quality MONITORING Station, (Location) both in English and Hindi or local language to be inscribed. The Signs boards to be mounted on the station with proper spacers.

1.1.9 Container Foundation (RCC)

L X W 6000 x 6000 mm

Height 300 mm from ground

Pillars: Nine concrete pillars of 300 mm above the ground level and below the ground level with 200 x 200 mm beam and between pillar bricks to be used for filling the space(**concrete ratio of 1:2:4**). Outer wall of the foundation to be plastered with 1:4, Cement: Sand ratio and same has to be painted with weather proof coat.

Top of the platform: RCC 150 mm with concrete ratio of 1:1:2 and to plaster and painted with weather proof paint.

Staircase: RCC Steps to approach the main door of the container and the UPS / Gas room door in the side to be provided and each step should not be more than 150

mm

1.1.10 Security Cabin

A 4 feet x 4 feet wooden / Paneled security cabin with chair and small folding table for security guard with covered overhead selves to be provided separately with the station container.

2. SPLIT AIR CONDITIONER

2.1 SPLITAIR CONDITIONER (2.0 TON CAPACITY)

2.1.1 Type& Capacity: 2 Nos. split type, 2 ton cooling only capacity Inverter AC, roof mounted of 5 star rating with an automatic timer. Separate Automatic Voltage stabilizer will be provided with each unit.

2.1.2 The indoor units should be running alternately at an interval of four hours with timer control and the temperature inside the station should be maintained at 25⁰C inside during all the time including peak summer months.

- a. Cooling Capacity: 7000 W
- b. Star Rating: BEE 5 star Inverter with Cooper Coil
- c. Indoor Noise Level: 40-50 dbA (cooling)
- d. Control Type: Remote
- e. Compressor: Inverter
- f. Refrigerant: Eco Friendly
- g. Feature: filter clean Indicator, defrosting Sensor
- h. Power supply: 230 volts \pm 10volts AC and 50 Hz \pm 3%
- i. Standard Warranty
- j. Remote: LCD Wireless.

2.2 SPLIT AIR CONDITIONER (1.0 TON CAPACITY)

2.2.1 Type & Capacity: 1 Nos. split type, 1 ton cooling only capacity Inverter AC, roof mounted of 5 star rating with an automatic timer. Separate Automatic Voltage stabilizer will be provided with each unit.

2.2.2 The indoor units should be running alternately at an interval of four hours with timer control and the temperature inside the station should be maintained at 25⁰Cinside during peak summer months.

- a) Cooling Capacity: 3400 W
- b) Star Rating: BEE 5 star Inverter with Cooper Coil
- c) Indoor Noise Level 40-50 dbA
- d) Control Type: Remote
- e) Compressor: Inverter

- f) Refrigerant: Eco Friendly
- g) Feature: filter clean Indicator, Pre-coated Aluminium fins etc.
- h) Power supply: 230 volts \pm 10volts AC and 50 Hz \pm 3%.
- i) Standard Warranty
- j) Remote: LCD Wireless.

3. ONLINE UNINTERRUPTED POWER SUPPLY (UPS)

3.1 ONLINE UPS 10 kVA, CAPACITY (Three Phase I/P &Single Phase O/P, with 01 hours backup) (for Air Conditioner)

Three phase 10 kVA UPS along with Automatic Delayed Restoration Device (ADRD) with 1 hour backup in full capacity should be provided for the smooth operation of one 2 Ton capacity split AC at the station. Automatic Phase Sequencer Device has to be installed along with the UPS.

a)	Capacity	:	10.0 kVA
b)	Technology	:	PWM using IGBT / MOSFETS
c)	Crest Factor	:	More than 3: 1
d)	Input	Voltage	: 415 V AC
		Voltage Range	: \pm 25%
		Frequency	: 50 Hz \pm 3%
e)	Output	Voltage	: 230 V AC
		Voltage regulation	: \pm 1%
		Frequency	: 50 Hz
		Frequency regulation	: \pm 0.01%
		Waveform	: Pure sine wave
f)	Battery	Battery type	: Sealed maintenance free
		Back up time	: 1 Hour at full load
		Battery Capacity	: For required backup time
		Recharge time	: 5 hrs to 90% after complete discharge
g)	Distortion	:	Less than 1% on linear load
h)	Power factor	:	0.9 to 1
i)	Indicator	:	L.E.D. – Battery Charge, Load level, on Line, over load, on battery, replace battery
j)	Alarm	:	Audible alarm for battery backup, battery low, and fault
k)	Protections	Surge	: Surge suppression meets BIS or International standard
		Overload	: Fuse & current limited
		Short circuit	: Fuse & current limited & cut – off
		Battery low cut – off	: No battery drain after cut - off
l)	Overload Capacity	:	110% for continuous load
m)	Efficiency	:	More than 90%
n)	Environment	Operating Temp.	: 0 – 50 ^o C
		Operating Hum.	: 10% to 95% (Non condensing)
		Audible Noise	: Less than 45 db (at 1 meter)

3.2 ONLINE UPS 5 KVA, CAPACITY (Single Phase I/P & Single phase O/P, with 02 hours backup) (01 for Analysers & 01 for Server at Central Station) :-

Single phase 5 kVA UPS along with Automatic Delayed Restoration Device (ADRD) with 2 hours backup in full capacity should be provided for the smooth operation of Analyzers and peripherals at the station:

3.2.1	Capacity	:	5.0 kVA
3.2.2	Technology	:	PWM using IGBT / MOSFETS
3.2.3	Crest Factor	:	More than 3: 1
3.2.4	Input	Voltage	: 230 V AC
		Voltage Range	: $\pm 25\%$
		Frequency	: 50 Hz $\pm 3\%$
3.2.5	Output	Voltage	: 230 V AC
		Voltage regulation	: $\pm 1\%$
		Frequency	: 50 Hz
		Frequency regulation	: $\pm 0.01\%$
		Waveform	: Pure sine wave
3.2.6	Battery	Battery type	: Sealed maintenance free
		Back up time	: 2 Hours at full load
		Battery Capacity	: For required backup time
		Recharge time	: 5 hrs to 90% after complete discharge
3.2.7	Distortion	:	Less than 1% on linear load
3.2.8	Power factor	:	0.9 to 1
3.2.9	Indicator	:	L.E.D. – Battery Charge, Load level, on Line, over load, on battery, replace battery
3.2.10	Alarm	:	Audible alarm for battery backup, battery low and fault
3.2.11	Protections	Surge	: Surge suppression meets BIS or International standard
		Overload	: Fuse & current limited
		Short circuit	: Fuse & current limited & cut – off
		Battery low cut – off	: No battery drain after cut - off
3.2.12	Overload Capacity	:	110% for continuous load
3.2.13	Efficiency	:	More than 90%
3.2.14	Environment	Operating Temp.	: 0 – 50 ^o C
		Operating Humidity	: 10% to 95% (Non condensing)
		Audible Noise	: Less than 45 db (at 1 meter)

4. CONTINUOUS AMBIENT AIR QUALITY MONITORING ANALYSERS for SO₂, NO-NO₂-NO_x, NH₃, CO, O₃ and BTEX

4.1 (General Specifications for all Analysers)

- 4.1.1 The analyzers should be 19" rack mounting model with facilities for fixing the analyzers from front side.
- 4.1.2 The front panel preferably have ON / OFF Switch.
- 4.1.3 The display of the entire important status signal viz. Sample flow, temperature, concentration, range selection, manual / auto mode, zero / span mode and all error messages should be on front panel.
- 4.1.4 The analyzers should operate at operating voltage 230 volts \pm 10 volts AC and 50 Hz \pm 3% frequency. The power supply input to be protected against spikes from and to the analyzer by an LC filter. The power connection cable should be CEE type complete with 15 Amperes plug adaptable to Indian mains socket.
- 4.1.5 The analyzers must function properly in Indian conditions without any defect between 0 – 40° C ambient temperature, 10 – 95% relative humidity and in high ambient dust levels. The data capture rate should not be less than 90% of operational time.
- 4.1.6 The Manufacturer shall provide comprehensive hands-on training for operational & preventive maintenance for one week in the respective State for three persons per station.
- 4.1.7 The analyzers should complete with calibration system. The calibration system should be delivered along-with respective span gas cylinder and permeation tubes. The span gas concentration should be within 60 – 90% of first measuring range. **The analyzer must have zero point internal calibration system and in agreement with minimum detection limit of each analyzer.** The calibration procedures are to be integrated into the software system for automatic calibration & remote calibration.

CALIBRATION GAS CYLINDER

- 4.1.8 **The supplier has to supply the calibration gas cylinder (highly polished aluminium 10 liters water capacity), along with SS Regulator, traceable to NIST for each components (SO₂, NO, CO, NH₃, Benzene & Toluene) along with SS regulator for the multipoint calibration.** The synthetic air and N₂ cylinder (99.99% purity with certificate) should be in Carbon Steel cylinder of 47 Liters water capacity along with SS Regulator.
- 4.1.9 The analyzers shall be supplied with all ancillaries necessary for operation with pump (preferably in built) and any other items such as charcoal scrubber, Teflon air sample intake filter, drier, Teflon tubing suitable for connection to air sampling manifold. All such items are to be itemized. Dust filter in all the analyzers should be provided before solenoid valve to protect frequent chocking of solenoid valve.
- 4.1.10 The connector systems for out-going signal for recording and the computer terminal should be on back panel with screw type connecting pins.
- 4.1.11 All ambient gas analyzers shall be approved by the USEPA / TUV. However, in case of BTEX Analyzer, it shall be approved by USEPA/TUV/MCERT. For Ammonia Analyzer specifications as given will be considered. **Method of measurement used shall also comply with the stipulation on National Ambient Air Quality Standards (NAAQS) 2009** (Details of Methods of Measurement is available at MoEF and CPCB websites). All analyzers shall be micro – processor controlled with automatic calibration using an external dilution calibrator and calibration standards. All analyzers should be fully integrated in the rack cabinet, fully calibrated & tested before supply and ready for start – up at the respective sites. Analyzer must exhibit performance equal to or better than values specified in the Calibration & test certificate provided with each analyzer.
- 4.1.12 The manufacturer shall specify the cross sensitivity of measurement for all the analyzers.

4.1.13 Each set of analyzers shall be supplied with two copies of elaborate operation manuals comprising details as below:

Parts (I) should comprise installation, operational and troubleshooting details; Parts (II) should have details about preventive, routine and corrective maintenance;

Parts (III) should comprise details of all electrical, electronic and pneumatic circuit diagrams, details of each spare parts, catalogue No. etc. and details of each electronic card / PCB's; and

Parts (IV) Schematic diagram for possible repair & maintenance. Parts (V)

Standard Operating Procedure (SOP) for each analyzer.

Parts (VI) List of equipments and other accessories along with contact details of supplier.

4.1.14 Digital Output:

a) Multi drop RS 232 port shared between gas Analyzers, Dust Analyzer (PM_{2.5}& PM₁₀), Meteorological Sensors and computer for data, status and control. Communication should have a USB port, TCP/IP Ethernet connection

4.1.15 Quality Control and Standard

Data shall be collected and validated according to US EPA standards, using the methodologies included in 40 Code of Federal Regulations. All analyzers shall have current US EPA reference or equivalent method designation and shall be of the latest design.

The supplier shall submit a Standard Operating Procedure for the air quality monitoring stations to the Buyer at the time of bid submission. This Standard Operating Procedure shall be approved by the Buyer prior to award. The Standard Operating Procedure shall contain the following:

- i. Operating procedures for all analyzers and meteorological sensors
- ii. Calibration procedures
- iii. Calibration schedule
- iv. Maintenance procedures
- v. Maintenance schedule
- vi. Data validation procedures
- vii. Quality Assurance procedures
- viii. Sample quality assurance documentation
- ix. Sample Air Quality Report

The calibration procedures for analyzers shall conform to US EPA methodologies and shall include daily calibration checks, by weekly precision checks and linearity checks every six weeks. All analyzers shall undergo full calibration in every three months. Data obtained from these calibration checks and copies of associated Quality Assurance and calibration documentation, shall be submitted to the Buyer along with the Air Quality Data.

Air Quality Data shall be submitted to the Buyer on Real Time basis through automated system and on a monthly basis in the form of an Air Quality Report. This report shall include tabular and graphic information on gas and dust concentrations as well as meteorological data for each site. The data shall be reported in the form of 15 minute averages and shall also include daily, weekly and monthly averages, minimum, maximum, standard deviations, total data captured and percent data capture. It should also have stat validation

mechanism and delayed data check mechanism. The Air Quality Report shall also include wind roses where wind speed and direction are measured.

4.2 SAMPLING SYSTEM

A suitable sampling system as specified by USEPA having 10 ports manifold and fitted with a suction pump to draw ambient air. System duly equipped with moisture removal systems should be provided for sampling of ambient air separately for gaseous and dust measurement.

Gases sampling system:

- | | | |
|-------|--------------------------------|--|
| 4.2.1 | Height of the sampling system: | Approx. 1.0 meter above the roof |
| 4.2.2 | Roof entry cut out: | Stainless Steel |
| 4.2.3 | Conduit: | Stainless Steel |
| 4.2.4 | Inner sampling system: | Borosilicate glass |
| 4.2.5 | Sampling head: | Stainless Steel |
| 4.2.6 | Manifold: | 10 port for tubes 6 x 1 mm, self-tightening. |
| 4.2.7 | Sample air flow sensor | Uni-directional sample air flow measuring |

device should be installed at the sampling system to measure the flow of ambient air through sampling system. The output of signal should be connected to computer to ascertain the continuous flow of sample from ambient air. The suction pump operational status should also be connected to the computer as a separate channel.

4.3 19" RACK

Suitable 19" Rack cabinet to accommodate all analyzers, calibrators, Zero air generators, data logger etc. The dimension of the rack without doors, with aluminum section and rear of 2 mm steel sheet, one removable roof plate, fitted with 4 lifting eyebolts. Four roof fixing screws included in package to replace the lifting eyebolts. One gland plate three part, one pair of 475 mm (19") mounting angles depth adjustable in 25 mm pitch pattern fitted on two fixing angles approximately 150 mm unit from the front standard. To accommodate panel width of 19" size: width = 600 mm, Height = 1400 mm and Depth = 800 mm. The 19" racks should be screwed to the floor of the station with anti-vibration pads. All nuts and bolts shall be cadmium coated.

5. AMBIENT AIR QUALITY MONITORING ANALYSERS (GAS)

5.1 AMBIENT SULPHUR DIOXIDE (SO₂) ANALYSER

01.	Principle	:	UV Fluorescence
02.	Measurement	:	SO ₂ in Ambient Air
03.	Display	:	Digital
04.	Ranges	:	Auto ranging 0 - 200 ppb
05.	Lower Detectable Limit	:	1 ppb
06.	Noise Level	:	0.5 ppb
07.	Zero Drift	:	< 1 ppb/24 Hrs. with automatic zero compensation
08.	Span Drift	:	<1 ppb in 24 hrs.
09.	Linearity	:	± 1% of full scale
11.	Response Time	:	120 sec or less
12.	Calibration	:	Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications(4.1.7 to 4.1.9)
13.	Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
14.	Digital Output	:	Multiple drop RS 232, USB port /TCP/IP ,Ethernet

5.2 AMBIENT OXIDES OF NITROGEN (NO-NO₂-NO_x) ANALYSER

01.	Principle	:	Chemiluminescence
02.	Measurement	:	NO-NO ₂ - NO _x in Ambient Air
03.	Display	:	Digital
04.	Ranges	:	Auto ranging 0-2000 ppb
05.	Lower Detectable Limit	:	1 ppb
06.	Noise Level	:	0.5 ppb
07.	Zero Drift	:	< 1 ppb/24 Hrs.
08.	Span Drift	:	< 2% in 15 days of full scale
09.	Linearity	:	± 1% of full scale
10.	Response Time	:	120 sec or less
11.	Calibration	:	Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications (4.1.7 to 4.1.9).
12.	Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
13.	Digital Output	:	Multi drop RS 232 port, USB port /TCP/IP ,Ethernet

5.3 AMBIENT AMMONIA ANALYSER (NH₃)

01.	Principle	Chemiluminescence (NH ₃ conversion to NO by oxidation. NO ₂ also converted to NO. The difference obtained by measuring NO in output of two sample stream as equal to NH ₃)
02.	Measurement	NH ₃ in Ambient Air
03.	Display	Digital
04.	Ranges	Auto ranging 0-1000 ppb
05.	Lower Detectable Limit	1 ppb
06.	Noise Level	0.2% of reading
07.	Zero Drift	<5 ppb /24 Hrs.
08.	Span Drift	< 2% in 15 days of full scale

09.	NH ₃ /NO converter	Quartz at approx. 1000° C
10.	Linearity	± 1% of full scale
11.	Response time	<300 second
12.	Rise / fall Time (95% of the final value)	< 30 Sec
13.	Calibration	Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications (4.1.7 to 4.1.9).
14.	Analog Output	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA a Digital output
15.	Digital Output	Multi drop RS 232 port, USB port /TCP/IP ,Ethernet

5.4 AMBIENT CARBON MONOXIDE (CO) ANALYSER

01.	Principle	:	Non Dispersive Infra-Red (NDIR) with Gas Filter Correlation/ Cross Flow Modulation Method
02.	Measurement	:	CO in Ambient Air
03.	Display	:	Digital
04.	Ranges	:	Auto ranging 0 - 100 ppm.
05.	Lower Detectable Limit	:	0.1 ppm
06.	Noise Level	:	0.05 ppm with time constant ± 30 seconds
07.	Zero Drift	:	< 0.2 ppm/7 days
08.	Span Drift	:	< 1% full scale in 24 hrs.
09.	Linearity	:	Continuous ± 1%
10.	Response Time	:	60 seconds or less
11.	Calibration	:	Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications (4.1.7 to 4.1.9).
12.	Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
13.	Digital Output	:	Multiple drop RS 232port, USB port /TCP/IP ,Ethernet

5.5 AMBIENT OZONE (O₃) ANALYSER

01.	Principle	:	UV Photometric / Chemiluminiscence
02.	Measurement	:	O ₃ in Ambient Air
03.	Display	:	Digital
04.	Range	:	Auto ranging 0 - 500 ppb
05.	Lower Detectable Limit	:	1.0 ppb
06.	Noise level	:	± 0.5 ppb
07.	Zero Drift	:	< ½% per month
08.	Span Drift	:	< 1% per month
09.	Linearity	:	Continuous ± 1%
10.	Response Time	:	30 seconds or less
11.	Calibration	:	With built in Zero and span generator and also see Multi-calibration section (Sl. No. 7)
12.	Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
13.	Digital Output	:	Multiple drop RS 232 port, USB port /TCP/IP ,Ethernet

5.6 AMBIENT BTEX ANALYSER

5.6.1 GENERAL

A complete analyzer system comprising of sampling pump, transfer line, analyzer, detector, calibrator, computer hardware and software for instrument control, data storage, display, acquisition, processing and for selective determination of volatile compounds in ambient air optimized for Benzene, Toluene, Ethyl Benzene and o, m, p –Xylenes. Continuous unattended measurement system of individual BTEX should work without external cryogenic cooling. System should have protocol compatible to communicate & transfer data to DAS. Raw data storage capacity without erase minimum for three month or more. The system should be delivered with all necessary spares, consumables, tubing etc. for making it functional.

5.6.2 TECHNICAL SPECIFICATIONS

A single stage membrane Pump collect ambient sample automatically an inbuilt adsorption trap. Subsequent, the sample will be dissolved and injected on wide bore capillary gas chromatographic separation. Sample volume controlled by thermal mass flow controller (dust protected). Sample flow range may be 20 -100 ml/min or more (adjustable). Sample volume should be between 400 ml – one liter or more of ambient air over a 10-15 min sampling cycle. All sample transfer tubing should be in stainless steel and flow & pressure sensor to be preferred with digital display.

5.6.3 DETECTOR

Photo Ionization Detector (**PID**) or other equivalent detector as per EPA/EU/TUV/MCERT approved specifications, which do not require hydrogen or other gas to operate it. The system should have auto-clean & auto calibration facilities. PID Lamp eV should be 10.6eV. PID sensitivity sensor should be available to check sensitivity.

5.6.4 MINIMUM SPECIFICATIONS

Principal	:	Based on gas Chromatographic separation and Photo Ionization Detector (PID)
Measurement	:	Benzene, Toluene, Ethyl-benzene, m.p-Xylene and O-Xylene.
Display	:	Digital
Range	:	0 - 100 ppb (0.32 – 325µg/m ³)
Lower detectable limit	:	0.2 ppb (0.65µg/m ³) for 15 min cycle for Benzene
Temperature Range	:	5 - 35°C or more
Repeatability	:	Retention Time : <0.1% RSD Concentration: <1.0% RSD
Typical Cycle Time	:	Total Cycle Time should not exceed 15min i.e. Sample Collection Time -15 min approx. Analytical Time- 15 min approx.
Sample Volume	:	1 liter for 15 min cycle.

Desorption tube	:	Carbotrap
Pre concentration	:	Carbopack
Calibration	:	The Analyzer should be capable to calibrate through Multi Calibration System also. Please see Multi-calibration section (Sl. No. 7) And also calibration section in General Specifications (4.1.7 & 4.1.9).
Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
Digital Output	:	Multi drop RS 232 port, USB port /TCP/IP ,Ethernet
Approval	:	USEPA/TUV/ MCERT approved BTEX Analyzer

6. CONTINUOUS AMBIENT AIR QUALITY MONITORING ANALYSERS (PARTICULATES)

6.1 CONTINUOUS PM₁₀ MONITORING ANALYSER (β -RAY ATTENUATION)

Based on the principle of β -ray attenuation, particulate sampled through the instrument and collected on fiberglass filter tape. Before and after sampling, β - ray radiation is measured by scintillation / G.M. counter. An internal microprocessor handles all sequences and automatically calculates the concentration of PM₁₀.

01.	Principle	:	β -ray attenuation
02.	Particle Size Cut Off	:	0 - 10 Microns
03.	Measuring Range	:	0 – 1000 $\mu\text{g}/\text{m}^3$
04.	Resolution	:	1% of the measurement range
05.	Lower Detection Limit	:	< 4.8 $\mu\text{g}/\text{m}^3$ (1 hour)
06.	Detector	:	Plastic Scintillator / GM Counter / Silicon-Semiconductor base
07.	Air Flow Rate	:	16.7 Liters / minute
08.	Filter Material	:	Glass Fiber Filter
09.	Display	:	LED / LCD
10.	Sampling Head	:	Dynamic heated sampling line with proper outer insulation for measurement of PM ₁₀ , with adjustable temperature 20 – 70 °C
11.	Calibration	:	Reference membrane facility should be provided for calibration of analyzer.
12.	Compatibility	:	Analyzer should be compatible with protocols of DAS system to be used in station.
13.	Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
14.	Digital Output	:	Multi drop RS 232 port USB port /TCP/IP /Ethernet
15.	Roll Length	:	Minimum 20 meters
16.	Measurement cycle time	:	1 hour
17.	Approval	:	USEPA/TUV approved Analyzer

6.2 CONTINUOUS PM_{2.5} MONITORING ANALYSER (β -RAY ATTENUATION)

Based on the principle of β -ray attenuation, particulate sampled through the instrument and collected on fiberglass filter tape. Before and after, sampling β - ray radiation is measured by scintillation / G.M. counter. An internal microprocessor handles all sequences and automatically calculates the concentration of PM_{2.5}.

01.	Principle	:	β -ray attenuation
02.	Particle Size Cut Off	:	0 – 2.5 Microns

03.	Measuring Range	:	0 – 1000 $\mu\text{g}/\text{m}^3$
04.	Resolution	:	1% of the measurement range
05.	Lower Detection Limit	:	< 4.8 $\mu\text{g}/\text{m}^3$ (1 hour)
06.	Detector	:	Plastic Scintillator / GM Counter / Silicon-Semiconductor base
07.	Air Flow Rate	:	16.7 Liters / minute
08.	Filter Material	:	Glass Fiber Filter
09.	Display	:	LED / LCD
10.	Sampling Head	:	Dynamic heated sampling line with proper outer insulation for measurement of $\text{PM}_{2.5}$ with adjustable temperature 20 – 70 °C
11.	Calibration	:	Reference membrane facility should be provided for multipoint calibration of analyzer.
12.	Compatibility	:	Analyzer should be compatible with protocols of DAS system to be used in station.
13.	Roll Length	:	Minimum 20 meters
14.	Analog Output	:	0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA
15.	Digital Output	:	Multi drop RS 232 port ,USB port /TCP/IP ,Ethernet
16.	Measurement Cycle Time	:	1 hour
17.	Approval	:	USEPA/TUV approved Analyzer

Note: A distance of around 1.5 meter should be maintained between two sampling heads of PM_{2.5} and PM₁₀samplers.

7. MULTICALIBRATOR

Calibration system should provide for the calibration of the ambient air quality monitoring analysers (Gas).

7.1 MULTI POINT GAS CALIBRATION SYSTEM:

1. The Gas Calibration System should be capable to do the following:
 - (i) Multipoint calibration using automatic dilution system for the calibration of SO₂, NO, CO, NH₃ and BTEX analyser.
 - (ii) Auto calibration (user selectable).
 - (iii) Generate zero air of 99.9% purity (High Performance Zero Air Generator to be provided).
 - (iv) Having facility for O₃ Generator for stable and repeatability calibration.
 - (v) Gas Phase Titration (GPT) with O₃ generator having 100% converter efficiency for conversion of NO to NO₂.
 - (vi) Calibration using permeation tubes for which at least two chambers based Permeation system has to be provided.
 - (vii) The Permeation System should be capable to accept permeation tubes up to 6 cm in length and 2cm in diameter with user selectable temperature setting of 40 °C and 50 °C.
2. System should be 19" rack mountable.
3. System should be DAS compatible for remote calibration from Central Server.
4. The system should also have facility for multipoint calibration of Ozone analyzer.

7.2 METEOROLOGICAL, FLOW AND ELECTRONICS CALIBRATION

The supplier should provide calibration devices or calibration check devices for all the meteorological parameters namely temperature, wind speed, wind direction, relative humidity, solar radiation, rain fall as per the specifications of the manufacturers.

8. METEOROLOGICAL SYSTEM

- 8.1** The meteorological instrumentation should be interfaced directly with the Data Acquisition System after passing through a lightning protection isolation box. A crank
 - up telescopic 10 meters tower should be erected for mounting of meteorological sensors. The relative humidity and solar radiation sensors should be mounted on the tower. The specifications are as follows:

(A) WIND SPEED

Range (Operation)	:	0 – 60 m/s or better
Sustainability	:	Upto 75 m/sec

Accuracy	:	± 0.5 m/sec or better
Resolution	:	0.1 m/sec
Sensor Type	:	Ultrasonic
Threshold	:	0.5 m/sec or less
Response time	:	10 sec or better

(B) WIND DIRECTION

Range	:	0 – 359 degree
Accuracy	:	± 3 degree or better
Resolution	:	1 degree
Sensor type	:	Ultrasonic
Threshold	:	0.5 m/sec or less
Response time	:	10 sec or better

(C) AMBIENT TEMPERATURE

Range	:	-10 ° C to 60 ° C
Accuracy	:	± 0.2 ° C or better (with radiation shield)
Response	:	10 seconds in still air
Resolution	:	0.1 ° C
Sensor type	:	Resistance type
Response time	:	10 sec or better

(D) RELATIVE HUMIDITY

Range	:	0 to 100% RH
Accuracy	:	± 3.0 % or better
Resolution	:	1%
Sensor type	:	Capacitive / Solid State
Response Time	:	10 sec or better

(E) SOLAR RADIATION

Range	:	0 to 1500 W/m ² or better
Accuracy	:	± 5.0 % or better
Resolution	:	5W/m ²
Sensor type	:	Silicon Photo diode

(F) RAINFALL

Range	:	0.2 mm to 100 mm /hr
Accuracy	:	$\pm 5\%$ or better
Resolution	:	0.2 mm
Sensor type	:	Tipping bucket rain gauge or any other suitable sensor
Response Time	:	10 sec or better

(G) TELESCOPIC CRANK – UP METEOROLOGICAL TOWER

The wind speed, wind direction, temperature, relative humidity and solar radiation sensors are to be mounted on the Meteorological Tower. The tower is to be a free standing four section telescopic tower provided with a hand crank to raise and lower the instruments mounted on the tower. Specifications are as follows:

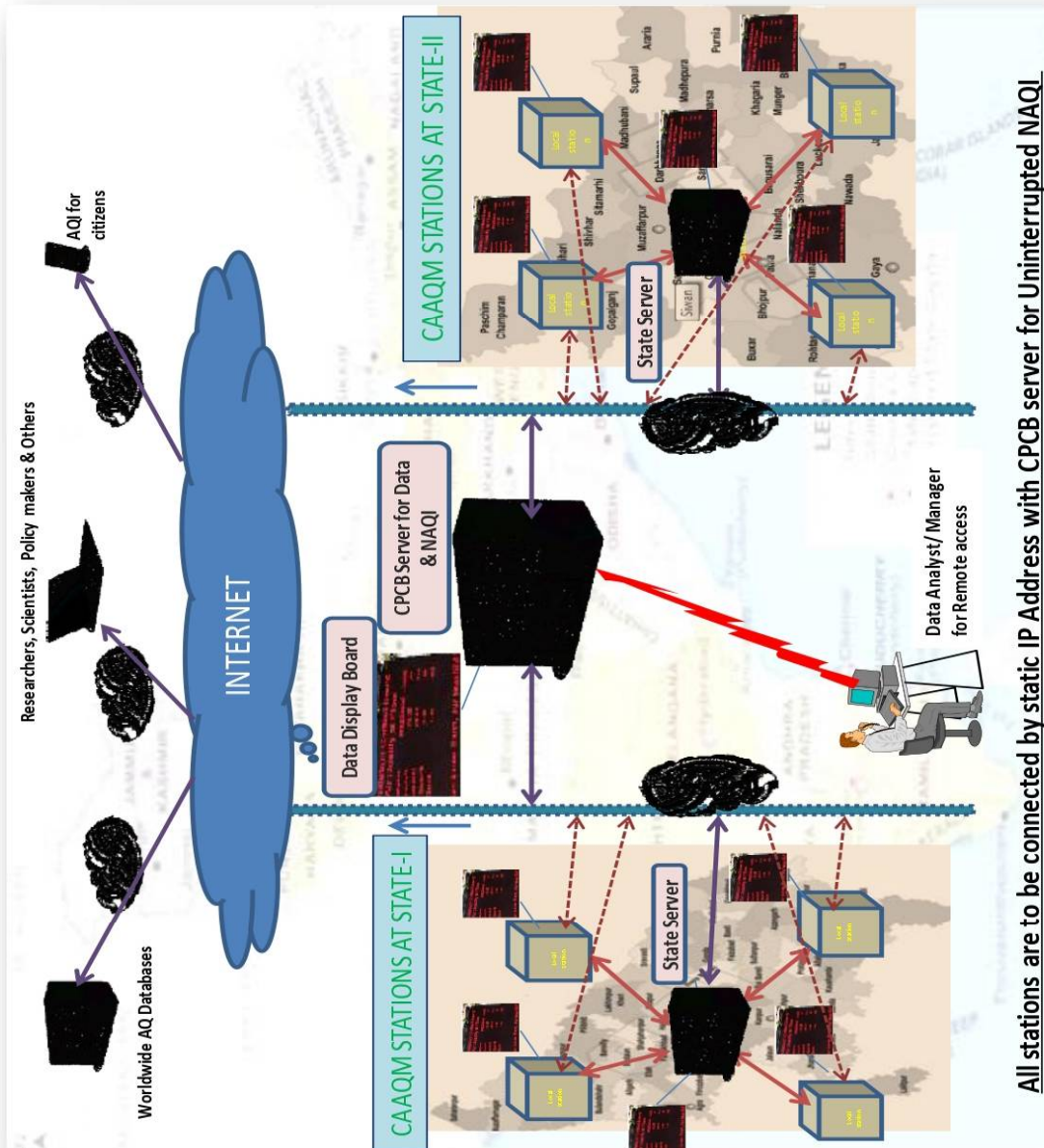
Extended Height	:	10 meters
Retracted Height	:	2 metres
Wind load Limit	:	0.7896 sq. m. (8.5 sq. ft) at 50 mph
Number of Sections	:	4
Construction material	:	Galvanised steel or aluminium

Note:

- (i) Humidity and temperature sensors are to be supplied with weather and thermal radiation shield made of anodized aluminium and sensor should be supplied with all necessary cables, connector and mounting arrangements as required.
- (ii) All the meteorological sensor should be certified/ traceable to World Meteorological Organization (WMO) and software should also have certification from the appropriate international agency or as directed by the Engineer in charge.

9. DATA ACQUISITION AND COMMUNICATION SYSTEM

9.1 Typical Architecture for Data Connectivity



- This architecture defines data transmission from all connected CAAQM Stations to State Data Center and Central Data Centre in parallel through internet (leased lines) in real time basis.
- All Stations are to be connected by static IP address with NMPA Server & KSPCB Services (Central DataServer) for uninterrupted NAQI.
- There should also provision in the station itself for data display of Pollutants parameters, Meteorological parameters and NAQI on display system near to Station.
- The CAAQM Station measure their respective pollutant and meteorological parameters and get them stored in data logger before transmission.
- From Data logger, data transmits for data display, and also through internet the same data is transmitted to Central server as well as State server for data display at Central level and State level, parallelly.
- Data display system at all locations display Pollutant, Meteorological and NAQI data on real time basis of all connected CAAQM Stations.

9.2 Data Acquisition and Handling System at Station

Type 1: System comprises of data logger having DAS and station computer. Or

Type 2: System comprises of station computer with DAS facilities.

Data logger/DAS with 8 analog, 24 digital inputs. Ability to log channels at different intervals and should have capability of averaging and displaying real time data and averaged data over a period of 1 min, 15 min, ½ hr, 1 hr, 4 hrs, 8 hrs, 24 hrs, 1 month and year. Communication between data logger and station computer should be using standard USB/RS232/RS485/ Ethernet Connector. The data logger should have internal battery with charger and if it is PC based UPS serves the purpose.

The data logger/DAS should support LAN and Internal GSM modem/ Wifi for data transfer to central server. Station computer for data logging will be in addition to workstation computer required for calculating AQI, and will be of same or better specifications that of work station computer. Presently network is envisaged for 250 such stations.

9.3 WORK STATION COMPUTER FOR AQI

This has to be installed at CAAQM station for the preparation of AQI along with the station computer.

Sl.No	Specifications	
1	CPU	Intel® Core i7 4 th generation or higher
2	Memory	8 GB DDR-III, 1600MHz, or better
3	Ethernet ports	Integrated intel ® Ethernet LAN 10/100/1000
4	PCI Slots	Two PCIe x16 half height
5	Optical Drive	DVD R/W Internal
6	HDD's	3.5" 1TB, SATA drives
7	Power Supply	Standard suitable power supply
8	Key board	Optical Keyboard same as OEM
9	Mouse	Standard Optical Mouse same as OEM
10	I/O ports	4*USB 3.0
11	Monitor	17" Wide LCD TFT Color Monitor or better
12	Wireless adapter	USB Wireless adapter x 1 no.
13	OS support	Open-source Ubuntu latest release
14	Warranty	Warranty is comprehensive on-site including spares for 3 / 3 / 3 years
15	Type	Tower type Black in color preferably or as per the fitting in station rack

9.4 MANAGEABLE CISCO SWITCH (RACK MOUNTABLE) Ethernet switch with LAN and WAN ports.

24 port managed fast/ gigabit Ethernet Cisco Switch with LAN and WAN ports of latest series for installation at respective location

9.5 REMOTE MONITORING TOOL/SOFTWARE

Remote management software and its licenses for the entire project duration for station computer and central location at NMPA.

9.6 42 U INDUSTRIAL RACK

This is to be installed at Central Sever location (at respective NMPA, CPCBKSPCB Head Office

Sl. No	Specification	QTY / site
1	19" Industrial Rack, 42U , Color Black Consisting of:-	1

2	Steel Enclosure, 9 Folded profile of dimensions 800 mm width * 1000 mm Depth * 42 U height, supporting 1000 Kgs load. Bottom cover with knock out holes for cable entry to be provided. Three pairs of horizontal support shall be fitted on both right and left sides.	1
3	Foldable Front & Rear Door to its half size while opening, shall be of 100% perforated. Provision for mounting fans on Rear door with concealed AC wiring.	2
4	Fan 230V, 90 CFM to be mounted on Rear Door.	4
5	AC Main Channel vertical two nos., 12x 5/15 Amps Sock RT-AQMP Make: Anchor with 32 Amps MCB make : Northwest or better	2
6	Horizontal Cable Manager	20
7	Vertical Cable Manager	10
8	Copper based Electrical Grounding / Earthing Strip. Provision for Fifteen (15) points.	1 Set
9	Each set of: a) Castor with Brake -- 2 Nos.	1 Set
	b) Adjustable screw legs --4 Nos. OR	
	c) Base frame – 1 No.	
10	Light provision activation in the rack up on opening of the front/rear door.	1
11	H/W Packet of 20 SRT-AQMP.	2

If anything, else is required to setup the system, vendor need to have provision at the time of quoting.

(B) DETAILS OF PROJECT STRUCTURE

- A. Successful Bidder would be awarded the project/work (the stations as per Scope of Work) under a Supply and Service Agreement, which would entail:
1. Supply, installation and Commissioning of One Set of CAAQMS Equipment at the defined cities/ locations at NMPA.
 2. Operation and Maintenance of the CAAQMS for a period of 05 (Five) years from the date of it's commissioning.
 3. Daily reporting of data pertaining to Ambient Air Quality to State Pollution Control Board (KSPCB)/NMPA/Central Pollution Control Board(CPCB).NMPA would make payment for CAAQMS as per schedule of requirement, for Supply, Installation and Commissioning of the system. The bidders therefore need to quote two prices for;
 - (a) Supply Installation and Commissioning of the System and;
 - (b) Reporting of data to NMPA/ KSPCB and CPCB with real time data display. The price for the data supply would include the Operation and Maintenance, including incidental charges, electricity, insurance, manpower, security, spares, repairs etc.,The land for

installation of CAAQMS free of cost, in the identified location to the Successful Bidder. Along with the land, The L1 successful bidder will make arrangement for telephone and electricity connection the proposed location. Bidder would bear the initial installation cost for these facilities and the monthly recurring cost pertaining to their usage (monthly telephone and electricity bill) would also be borne by the Successful Bidder.

II. Scope of CAAQM Station & O & M

B. SCHEDULE OF REQUIREMENTS

The CAAQMS shall have the following schedule of requirement. The system should be completely functional. Any balance of material not specified but required for the purpose must be supplied by the bidder.

1	<p>CAAQM STATION –Housing/Container: It is designed for housing the ambient air quality monitoring instruments to protect them from dust and heat. Temperature and Humidity sensors shall be installed in the housing for checking the humidity and temperature inside the station. Three Nos. 19” racks shall be installed inside the station so that the analyzers are easily accessible from front & back for calibration and maintenance.</p> <p>Dimensions: Inside length: 4200 mm Inside width: 3500 mm Inside height: 2500 mm (As per the Drawing given)</p> <p>Frame: All the material used for the construction of the floor, frame, roof frame etc, the 4 corner posts and 8 integrated, reinforced container corners should be of metal. The exterior panel of the container shall be made of pre-coated MS Sheet of approved colour shade. All other steel parts should be hot dipped galvanized having minimum rate of galvanization of 275 gram per square meter (IS277). All joints of like metal such as steel-to-steel or aluminum-to-aluminum shall be protected against corrosion by liberal application of joining compound. All joints of dissimilar metals such as steel to aluminum shall be protected against corrosion due to galvanic action by liberal application of dielectric compound as well as jointing compound on both mating surfaces. For lifting / fixing the container, International Standard eye bolts should be provided at the corners.</p> <p>Paneling: The outer paneling will be of 1.2 mm of Pre-coated MS sheet to</p>
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withstand external impacts and abrasions. Outer side of the MS Sheet i.e. exposed face of the sheet, shall be permanently colour coated with silicon modified polyester coating of dry film thickness (DFT) 20 micron (min.) of approved colour shade over primer. Inner face of the sheet shall be provided with suitable pre-coating of minimum 7 micron off-white colour.

The inner paneling will be of PVC coated 2 mm thick aluminum sheet, fixed over an inlay of 4 mm marine plywood. 100 mm thick polyurethane insulation will be used between the outer and inner walls (Pre-coated MS sheet and Marine plywood) as insulating material. Z spacers if required shall be made out of at least 2 mm thick galvanized steel sheet of grade 275 as per IS:277

Floor: The floor will be laid in frame of 600 x 600 mm centre to centre with 50 x50 x 6 mm MS angle. The floor surface will be of 19 mm marine plywood covered with robust quality Vinyl flooring, 2 mm thick of approved colour. The floor should be of acid and alkaline resistant, waterproof, easily cleanable / washable. Bottom plate of thickness 2 mm hot dipped galvanized MS Plate shall be provided.

Outer Door: One door of size 2000 x 900 mm will be provided at the front side (L = 4200 mm) of the station with isolated 3 – point locking & door handle flush fitted.

Electric Power Supply Box: Three - phase (3 Ø) electrical wiring will be laid in ducts. Copper wiring of appropriate gauge will be used. The terminal board should be mounted in a central power distribution box. Over voltage protection for each phase shall be provided along with the lightning arrestor. 2 numbers Emergency cut off switch & Thermostat switch (max 350C) for power disconnection, 6 free sockets and 3 fluorescent lamps for lighting will be provided. The station shall be properly grounded with chemical earthing or as per BIS Standards with proper plate and only copper strip at least on 2 corners (diametrically opposite). One three phase energy meter (Digital Type) shall be installed. Weatherproof cubicles / enclosure for housing of MCB / TP & N Switch of main power termination (outside shelter) and weatherproof telephone junction box for terminations of telephone line are to be provided. Proper earthing for telescopic mast of meteorological system shall be provided.

There should be conduction between the telescopic mast of the meteorological system and the station. The guy ropes or wires shall be provided for supporting the mast.

List of Consumables:

All Fuses : 02 set,

Lightning arrestor : 02 set,

Emergency Switch : 02 pcs,

Thermostat : 01 pc

Partitioning for Calibration Gas Cylinders, Meteorological Mast and UPS:

The housing will be partitioned as per drawing to create space for storing of gas cylinders, Meteorological mast & UPS. The size will be 2000 x 1400 x 2300 mm.

A lockable door of size 900 x 2000 mm along-with 3 – Point locking system shall be provided on the outer wall of the housing. A 300 mm, single-phase (230 volts, 10 volts AC and 50 Hz \pm 3%) exhaust fan with safety grills will be provided.

Mounting brackets in 2 levels for fixing of at-least 06 (six) gas cylinders should be provided. The internal lights of the housing should be sensor based. Air

conditioners shall be mounted on proper rust proof supporting structures with rubber blocks to avoid vibration of structures. Proper caging / grill should also be provided for the safety of ACs. Sun shades for external AC units shall be

provided with fabricated pre-coated MS sheet (same as monitoring station) with supporting arrangements. AC unit's external piping shall be placed in GI trays.

Cable trays fixed on exterior wall shall be covered with pre-coated MS sheet, of same colour shade of monitoring station. Roof top sheet to be levelled and

sloped properly. Rain water spout shall be fixed at top with rain water down pipe at two corners. The external lights of the station should be Solar operated

Station Furnishing:

(i) 19" racks – 03 Nos,

(ii) Fire extinguishers – 02 Nos. (Clean Agent – 2 KG each),

(iii) Furniture:

a) Material - Furniture made of water resistant laminated board

b) Cupboard – As per drawing

Working table – Powdered coated MS frame size 1400 x 900 x 750 mm (w x d x h) and top 19 mm thickness Board.

	<p>d) Revolving tilting chair – 02 Nos.</p> <p>(iv) Miscellaneous</p> <p>a) The exhaust gases from the analyzer should be collected and discharged by a common exhaust pipe and vented.</p> <p>b) Folding aluminium ladder for roof access (Length.... with 1 feet width steps)</p> <p>c) Sensor for measuring the inside temperature of the station and Display</p> <p>d) Hygrometer for measurement of Humidity inside the station and Display</p> <p>e) Mounting bracket for the ladder,</p> <p>f) No smoking stickers,</p> <p>g) Vacuum cleaner with minimum 100 watt power</p> <p>h) Tool Kit having following tools:</p> <ol style="list-style-type: none"> 1. One screw driver set, 2. One Digital multi-meter (Philips, Micro or equivalent make). 3. One box spanner set, 4. One D spanner set, 5. One watch maker set, 6. One Hammer set, 7. One precision screw driver set 8. One pliers set, 9. One Tong tester, 10. One Soldering Iron with stand, <p>i) One Emergency LED Cluster light</p> <p>j) Sign boards along-with logo of Central Pollution Control Board, Delhi / State Pollution Control Board, to be embedded with size 1500 x 900 mm on the front of the container and on the two side of the container, The name of the Station i.e. Continuous Ambient Air Quality MONITORING Station, (Location) both in English and Hindi or local language to be inscribed. The Signs boards to be mounted on the station with proper spacers</p>
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	<p>Security Cabin : A 4 feet x 4 feet wooden / Paneled security cabin with chair and small folding table for security guard with covered overhead selves to be provided separately with the station container.</p>
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	1. Earth work excavation
	2. Providing and Construction of RCC Foundation for the Housing Container, Accessories and allied works with M30 Grade of Concrete. As per the requirement of the approved structures and Equipment's for CAAQMS Provisions for concrete Quantities.
	3. Supplying, Fitting and Placing TMT Fe 500 & above Reinforcement
2	<p>Ambient Air Quality Monitoring Analyzers for various parameters such as (Sulphur Di Oxide SO₂, Oxides of Nitrogen (NO/NO₂ NOX), Ozone, VOC, Benzene, Tolulene, Ethylrene Benzene, Oo-m-p Xylene, Carbon Monoxide(CO), The analyzers should be 19" rack mounting model with facilities for fixing the analyzers from front side. The front panel preferably has ON / OFF Switch. The display of the entire important status signal viz. Sample flow, temperature, concentration, range selection, manual / auto mode, zero / span mode and all error messages should be on front panel. The analyzers should operate at operating voltage 230 volts \pm 10 volts AC and 50 Hz \pm 3% frequency. The power supply input to be protected against spikes from and to the analyzer by an LC filter. The power connection cable should be CEE type complete with 15 Amperes plug adaptable to Indian mains socket.</p> <p>The analyzers must function properly in Indian conditions without any defect between 0 – 40o C ambient temperature, 10 – 95% relative humidity and in high ambient dust levels. The data capture rate should not be less than 90% of operational time.</p> <p>The Manufacturer shall provide comprehensive hands-on training for operational & preventive maintenance for one week in the respective State for three persons per station.</p> <p>The analyzers should complete with calibration system. The calibration system should be delivered along-with respective span gas cylinder and permeation tubes. The span gas concentration should be within 60 – 90% of first measuring range. The analyzer must have zero point internal calibration system and in agreement with minimum detection limit of each analyzer. The calibration procedures are to be integrated into the software system for automatic calibration & remote calibration. The cost of the Gas Cylinder and Multi calibration and meteorological, Flow and Electronic calibration system shall be paid separately in other Item of work.</p> <p>The analyzers shall be supplied with all ancillaries necessary for operation with pump (preferably in built) and any other items such as charcoal scrubber, Teflon air sample intake filter, drier, Teflon tubing suitable for connection to air sampling manifold.</p>

	<p>All such items are to be itemized. Dust filter in all the analyzers should be provided before solenoid valve to protect frequent chocking of solenoid valve.</p> <p>The connector systems for out-going signal for recording and the computer terminal should be on back panel with screw type connecting pins.</p>
	<p>All ambient gas analyzers shall be approved by the USEPA / TUV. However, in case of BTEX Analyzer, it shall be approved by USEPA/TUV/MCER. For Ammonia Analyzer specifications as given will be considered. Method of measurement used shall also comply with the stipulation on National Ambient Air Quality Standards (NAAQS) 2009 (Details of Methods of Measurement is available at MoEF and CPCB websites). All analyzers shall be micro – processor controlled with automatic calibration using an external dilution calibrator and calibration standards. All analyzers should be fully integrated in the rack cabinet, fully calibrated & tested before supply and ready for start – up at the respective sites. Analyzer must exhibit performance equal to or better than values specified in the Calibration & test certificate provided with each analyzer.</p> <p>The manufacturer shall specify the cross sensitivity of measurement for all the analyzers. Each set of analyzers shall be supplied with two copies of elaborate operation manuals comprising details as below:</p> <p>Parts (I) should comprise installation, operational and troubleshooting details;</p> <p>Parts (II) should have details about preventive, routine and corrective maintenance;</p> <p>Parts(III)should comprise details of all electrical, electronic and pneumatic circuit diagrams, details of each spare parts, catalogue No. etc. and details of each electronic card / PCB's; and</p> <p>Parts (IV) Schematic diagram for possible repair & maintenance. Parts</p> <p>(V) Standard Operating Procedure (SOP) for each analyzer.</p> <p>Parts (VI) List of equipment's and other accessories along with contact details of supplier.</p> <p>Digital Output,</p> <p>a) Multi drop RS 232 port shared between gas Analyzers, Dust Analyzer (PM2.5& PM10), Meteorological Sensors and computer for data, status and control. Communication should have a USB port, TCP/IP Ethernet connection</p> <p>Quality Control and Standard. Data shall be collected and validated according to US EPA standards, using the methodologies included in 40 Code of Federal Regulations. All</p>

	<p>analyzers shall have current US EPA reference or equivalent method designation and shall be of the latest design.</p>
	<p>The supplier shall submit a Standard Operating Procedure for the air quality monitoring stations to the Buyer at the time of bid submission. This Standard Operating Procedure shall be approved by the Buyer prior to award. The Standard Operating Procedure shall contain the following:</p> <ul style="list-style-type: none"> i. Operating procedures for all analyzers and meteorological sensors ii. Calibration procedures iii. Calibration schedule iv. Maintenance procedures v. Maintenance schedule vi. Data validation procedures vii. Quality Assurance procedures viii. Sample quality assurance documentation ix. Sample Air Quality Report <p>The calibration procedures for analyzers shall conform to US EPA methodologies and shall include daily calibration checks, by weekly precision checks and linearity checks every six weeks. All analyzers shall undergo full calibration in every three months. Data obtained from these calibration checks and copies of associated Quality Assurance and calibration documentation, shall be submitted to the Buyer along with the Air Quality Data. Air Quality Data shall be submitted to the Buyer on Real Time basis through automated system and on a monthly basis in the form of an Air Quality Report. This report shall include tabular and graphic information on gas and dust concentrations as well as meteorological data for each site. The data shall be reported in the form of 15-minute averages and shall also include daily, weekly and monthly averages, minimum, maximum, standard deviations, total data captured and percent data capture. It should also have stat validation Mechanism and delayed data check mechanism.</p> <p>The Air Quality Report shall also include wind roses where wind speed and direction are measured</p> <p>.1). Improved West and Geake method or 2). Ultra Violet Fluoresce.</p>
	<p>Supply, Erection, Installation, Testing and Commissioning of Continuous Ambient Sulphur Dioxide (SO₂) Analyzer, µg/m³</p>

1.	<p>1). Improved West and Geake method or 2). Ultra Violet Fluoresce.</p> <p>AMBIENT SULPHUR DIOXIDE (SO₂) ANALYSER</p> <p>01.Principle:UV Fluorescence 02. Measurement : SO₂in Ambient Air 03. Display : Digital 04. Ranges : Auto ranging 0 - 200 ppb 05. Lower Detectable Limit : 1 ppb 06. Noise Level : 0.5 ppb 07. Zero Drift : < 1 ppb/24 Hrs. with automatic zero compensation 08. Span Drift : <1 ppb in 24 hrs. 09. Linearity : ± 1% of full scale 11. Response Time : 120 sec or less 12. Calibration : Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications(4.1.7 to 4.1.9) 13. Analog Output : 0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA 14. Digital Output : Multiple drop RS 232, USB port /TCP/IP ,Ethernet, Including Latest Updates.</p> <p>Note (In addition to the above the General Conditions and Specification of Analyzer shall be similar to Item No 5. All Complete As directed by the Engineer In Charge.</p>
2	<p>Supply, Erection, Installation, Testing and Commissioning of Continuous Ambient Oxides of Nitrogen (NO/NO₂ NO_x) Analyzer, µg/m³</p> <p>1). -Jacob & Hochheiser modified (NaOH-NaAsO₂) Method or 2). Gas Phase Chemiluminescence.</p> <p>AMBIENT OXIDES OF NITROGEN (NO-NO₂-NO_x) ANALYSER</p> <p>01. Principle : Chemiluminescence 02. Measurement : NO-NO₂- NO_x in Ambient Air 03. Display : Digital 04. Ranges : Auto ranging 0-2000 ppb 05. Lower Detectable Limit : 1 ppb 06. Noise Level : 0.5 ppb 07. Zero Drift : < 1 ppb/24 Hrs. 08. Span Drift : < 2% in 15 days of full scale</p>

	<p>09. Linearity : $\pm 1\%$ of full scale</p> <p>10. Response Time : 120 sec or less</p> <p>11. Calibration : Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications (4.1.7 to 4.1.9).</p> <p>12. Analog Output : 0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA</p> <p>13. Digital Output : Multi drop RS 232 port, USB port /TCP/IP ,Ethernet, Including Latest Updates.</p> <p>. All Complete As directed by the Engineer In Charge.</p>
3	<p>AMBIENT AMMONIA ANALYSER (NH₃)</p> <ol style="list-style-type: none"> 1. Principal : Chemiluminescence (NH₃ conversion to NO by oxidation. NO₂ also converted to NO. The difference obtained by measuring NO in output of two sample stream as equal to NH₃). 2. Measurement: NH₃ in Ambient Air. 3. Display : Digital. 4. Ranges : Auto rning 0-1000 ppb 5. Lower Detectable Limit : 1 ppb. 6. Noise level : 0.2% of reading 7. Zero Drift : <5ppb /24hrs. 8. Span Drift : <2% in 15 days of full scale 9. NH₃/NO converter : Quartz at approx. 1000° C 10. Linearity : $\pm 1\%$ of full scale 11. Response time : <300 second 12. Rise/fall time (955 of the final value): < 30 Sec 13. Calibration : Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications (4.1.7 to 4.1.9 14. Analog Output :). 0 – 1 V, 0 – 10 V, 2 – 20 mA /4 – 20 mA a Digital output 15. Digital Output :Multi drop RS 232 port, USB port /TCP/IP ,Ethernet

4	<p>Supply, Errection, Installation, Testing and Commissioning of Continuous Ambient Ozone(O3) Analyzer, µg/m3</p> <ol style="list-style-type: none"> 1). UV-Photometric method or 2). Gas Phase Chemiluminescence method or 3). -Chemical Method <p>AMBIENT OZONE (O3) ANALYSER</p> <ol style="list-style-type: none"> 01. Principle : UV Photometric / Chemiluminescence 02. Measurement : O3 in Ambient Air 03. Display : Digital 04. Range : Auto ranging 0 - 500 ppb 05. Lower Detectable Limit : 1.0 ppb 06. Noise level : ± 0.5 ppb 07. Zero Drift : < ½% per month 08. Span Drift : < 1% per month 09. Linearity : Continuous + 1% 10. Response Time : 30 seconds or less 11. Calibration : With built in Zero and span generator and also see Multi-calibration section (Sl. No. 7) 12. Analog Output : 0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA 13. Digital Output : Multiple drop RS 232 port, USB port /TCP/IP ,Ethernet, Including Latest Updates. <p>Note (In addition to the above the General Conditions and Specification of Analyzer shall be similar to Item No 5. All Complete As directed by the Engineer In Charge.</p>
5	<p>Supply, Erection, Installation, Testing and Commissioning of Continuous Ambient volatile compounds in ambient air optimized for Benzene, Toluene, Ethyl Benzene and o, m, p –Xylenes. Analyzer</p> <ol style="list-style-type: none"> 1). Gas Chromatography (GC) based continuous analyzer. 2). Adsorption and desorption followed by GC analysis. <p>GENERAL : A complete analyzer system comprising of sampling pump, transfer line, analyzer, detector, calibrator, computer hardware and software for instrument control, data storage, display, acquisition, processing and for selective determination of volatile compounds in ambient air optimized for Benzene, Toluene, Ethyl Benzene and o, m, p – Xylenes. Continuous unattended measurement system of individual BTEX should work</p>

without external cryogenic cooling. System should have protocol compatible to communicate & transfer data to DAS. Raw data storage capacity without erase minimum for three month or more. The system should be delivered with all necessary spares, consumables, tubing etc. for making it functional.

TECHNICAL SPECIFICATIONS : A single stage membrane Pump collect ambient sample automatically an inbuilt adsorption trap. Subsequent, the sample will be dissolved and injected on wide bore capillary gas chromatographic separation. Sample volume controlled by thermal mass flow controller (dust protected). Sample flow range may be 20 -100 ml/min or more (adjustable). Sample volume should be between 400 ml – one liter or more of ambient air over a 10-15 min sampling cycle. All sample transfer tubing should be in stainless steel and flow & pressure sensor to be preferred with digital display.

DETECTOR : Photo Ionization Detector (PID) or other equivalent detector as per EPA/EU/TUV/MCERT approved specifications, which do not require hydrogen or other gas to operate it.

The system should have auto-clean & auto calibration facilities. PID Lamp eV should be 10.6eV. PID sensitivity sensor should be available to check sensitivity.

MINIMUM SPECIFICATIONS

Principal: Based on gas Chromatographic separation Photo Ionization Detector (PID) and Measurement : Benzene, Toluene, Ethyl-benzene, m.p-Xylene o-Xylene. and Display : Digital

Range : 0 - 100 ppb
(0.32 – 325mg/m³)

Lower limit detectable : 0.2 ppb (0.65mg/m³) for 15 min cycle for Benzene

Temperature Range : 5 - 35oC or more

Repeatability : Retention Time : <0.1% RSD Concentration: <1.0% RSD

Typical Cycle Time : Total Cycle Time should not exceed Sample Collection Time -15 min approx. Analytical Time- 15 min approx. 15min i.e.

Sample Volume : 1 liter for 15 min cycle.

Desorption tube : Carbo-trap

Pre concentration : Carbo- pack

Calibration : The Analyzer should be capable to calibrate through Multi Calibration

	<p>System also. Please see Multi-calibration section (Sl. No. 7) And also calibration section in General Specifications (4.1.7 & 4.1.9).</p> <p>Analog Output : 0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA</p> <p>Digital Output : Multi drop RS 232 port, USB port /TCP/IP ,Ethernet</p> <p>Approval : USEPA/TUV/ MCERT approved BTEX Analyzer, including latest updates. and Supply, Erection, Installation, Testing and Commissioning of .ADDITIONAL PARAMETER OF Nickel, Arsenic, Lead, Ammonia-Benzo, Pyrine(Bap) All Complete As directed by the Engineer In Charge.</p>
6	<p>AMBIENT CARBON MONOXIDE (CO) ANALYSER</p> <p>1). Non dispersive Infrared (NDIR) Method or</p> <p>2). Spectroscopy.</p> <p>01. Principle : Non Dispersive Infra-Red (NDIR) with Gas Filter Correlation/ Cross Flow Modulation Method</p> <p>02. Measurement : CO in Ambient Air</p> <p>03. Display : Digital</p> <p>04. Ranges : Auto ranging 0 - 100 ppm.</p> <p>05. Lower Detectable Limit : 0.1 ppm</p> <p>06. Noise Level : 0.05 ppm with time constant ± 30 seconds</p> <p>07. Zero Drift : < 0.2 ppm/7 days</p> <p>08. Span Drift : < 1% full scale in 24 hrs.</p> <p>09. Linearity : Continuous + 1%</p> <p>10. Response Time : 60 seconds or less</p> <p>11. Calibration : Please see Multi-calibration section (Sl. No. 7) and also calibration section in General Specifications (4.1.7 to 4.1.9).</p> <p>12. Analog Output : 0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA</p> <p>13. Digital Output : Multiple drop RS 232port, USB port /TCP/IP ,Ethernet, Including Latest Updates.</p> <p>Note (In addition to the above the General Conditions and Specification of Analyzer shall be similar to Item No 9.All Complete As directed by the Engineer In Charge .</p>

CALIBRATION GAS CYLINDERS

The supplier has to supply the calibration gas cylinder (highly polished aluminum 10 liters water capacity), along with SS Regulator, traceable to NIST for each components (SO₂, NO, CO, Benzene & Toluene) along with SS regulator for the multipoint calibration. The synthetic air and N₂ cylinder (99.99% purity with certificate) should be in Carbon Steel cylinder of 47 Liters water capacity along with SS Regulator.

The analyzers shall be supplied with all ancillaries necessary for operation with pump (preferably in built) and any other items such as charcoal scrubber, Teflon air sample intake filter, drier, Teflon tubing suitable for connection to air sampling manifold. All such items are to be itemized. Dust filter in all the analyzers should be provided before solenoid valve to protect frequent chocking of solenoid valve.

The connector systems for out-going signal for recording and the computer terminal should be on back panel with screw type connecting pins. Including Latest Updates.

7

CONTINUOUS PM₁₀ MONITORING ANALYSER (b-RAY ATTENUATION)

- 1). Gravimetric Method Or
- 2). TEOM Method Or
- 3). Beta attenuation Method

Based on the principle of b-ray attenuation, particulate sampled through the instrument and collected on fiberglass filter tape. Before and after sampling b- ray radiation is measured by scintillation / G.M. counter. An internal microprocessor handles all sequences and automatically calculates the concentration of PM₁₀.

01. Principle : b-ray attenuation
02. Particle Size Cut Off : 0 - 10 Microns
03. Measuring Range : 0 – 1000 mg/m³
04. Resolution : 1% of the measurement range
05. Lower Detection Limit : < 4.8mg/m³(1 hour)
06. Detector : Plastic Scintillator / GM Counter / Silicon- Semiconductor base
07. Air Flow Rate : 16.7 Liters / minute
08. Filter Material : Glass Fiber Filter
09. Display : LED / LCD
10. Sampling Head : Dynamic heated sampling line with proper outer insulation for measurement of PM₁₀, with adjustable temperature 20 – 70 °C
11. Calibration : Reference membrane facility should be provided for calibration of

	<p>analyzer.</p> <p>12. Compatibility : Analyzer should be compatible with protocols of DAS system to be used in station.</p> <p>13. Analog Output : 0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA</p> <p>14. Digital Output : Multi drop RS 232 port USB port /TCP/IP /Ethernet</p> <p>15. Roll Length : Minimum 20 meters</p> <p>16. Measurement cycle time : 1 hour</p> <p>17. Approval : USEPA/TUV approved Analyzer. Including Latest Updates.</p> <p>Complete As directed by the Engineer In Charge.</p>
	<p>Note: A distance of around 1.5 meter should be maintained between two sampling heads of PM2.5 and PM10 samplers.</p> <p>Multi drop RS 232 port shared between gas Analyzers, Dust Analyzer (PM2.5& PM10), Meteorological Sensors and computer for data, status and control. Communication should have a USB port, TCP/IP Ethernet connection</p>
8	<p>CONTINUOUS PM2.5 MONITORING ANALYSER (b-RAY ATTENUATION)</p> <p>1). Gravimetric Method Or 2). TEOM Method Or 3). Beta attenuation Method Based on the principle of b-ray attenuation, particulate sampled through the instrument and collected on fiberglass filter tape. Before and after, sampling b- ray radiation is measured by scintillation / G.M. counter. An internal microprocessor handles all sequences and automatically calculates the concentration of PM2.5.</p> <p>01. Principle : b-ray attenuation</p> <p>02. Particle Size Cut Off : 0 – 2.5 Microns</p> <p>03. Measuring Range : 0 – 1000 mg/m³</p> <p>04. Resolution : 1% of the measurement range</p> <p>05. Lower Detection Limit : < 4.8 mg/m³ (1 hour)</p> <p>06. Detector : Plastic Scintillator / GM Counter / Silicon- Semiconductor base</p> <p>07. Air Flow Rate : 16.7 Liters / minute</p> <p>08. Filter Material : Glass Fiber Filter</p> <p>09. Display : LED / LCD</p> <p>10. Sampling Head : Dynamic heated sampling line with proper outer insulation for measurement of PM2.5 with adjustable temperature 20 – 70 0C</p> <p>11. Calibration :Reference membrane facility should be provided for multipoint calibration of analyzer.</p>

	<p>12. Compatibility: Analyzer should be compatible with protocols of DAS system to be used in station.</p> <p>13. Roll Length : Minimum 20 meters</p> <p>14. Analog Output : 0 – 1 V, 0 – 10 V, 2 – 20 mA / 4 – 20 mA</p> <p>15. Digital Output : Multi drop RS 232 port ,USB port /TCP/IP ,Ethernet</p> <p>16. Measurement Cycle Time : 1 hour</p> <p>17. Approval : USEPA/TUV approved Analyzer. Including Latest Updates.</p>
	<p>Note: A distance of around 1.5 meter should be maintained between two sampling heads of PM2.5 and PM10 samplers.</p> <p>Multi drop RS 232 port shared between gas Analyzers, Dust Analyzer (PM2.5& PM10), Meteorological Sensors and computer for data, status and control. Communication should have a USB port, TCP/IP Ethernet connection</p>
9	<p>MULTICALIBRATOR</p> <p>Calibration system should provide for the calibration of the ambient air quality monitoring analyzers (Gas).</p> <p>MULTI POINT GAS CALIBRATION SYSTEM:</p> <ol style="list-style-type: none"> 1. The Gas Calibration System should be capable to do the following: <ol style="list-style-type: none"> (i) Multipoint calibration using automatic dilution system for the calibration of SO₂, NO, CO, NH₃ and BTEX analyzer. (ii) Auto calibration (user selectable). (iii) Generate zero air of 99.9% purity (High Performance Zero Air Generator to be provided). (iv) Having facility for O₃ Generator for stable and repeatability calibration. (v) Gas Phase Titration (GPT) with O₃ generator having 100% converter efficiency for conversion of NO to NO₂. (vi) Calibration using permeation tubes for which at least two chambers based Permeation system has to be provided. (vii) The Permeation System should be capable to accept permeation tubes up to 6 cm in length and 2cm in diameter with user selectable temperature setting of 40 OC and 50 OC. 2. System should be 19" rack mountable. 3. System should be DAS compatible for remote calibration from Central Server. 4. The system should also have facility for multipoint calibration of Ozone analyzer. <p>Including Latest Updates.</p>

10	<p>SAMPLING SYSTEM A suitable sampling system as specified by USEPA having 10 ports manifold and fitted with a suction pump to draw ambient air. System duly equipped with moisture removal systems should be provided for sampling of ambient air separately for gaseous and dust measurement.</p> <p>Gases sampling system: Height of the sampling system: Approx. 1.0 meter above the roof</p> <p>Roof entry cut out: Stainless Steel</p> <p>Conduit: Stainless Steel</p> <p>Inner sampling system: Borosilicate glass</p> <p>Sampling head: Stainless Steel</p> <p>Manifold: 10 port for tubes 6 x 1 mm, self-tightening.</p> <p>Sample air flow sensor, Uni-directional, sample air flow measuring</p> <p>Device should be installed at the sampling system to measure the flow of ambient air through sampling system. The output of signal should be connected to computer to ascertain the continuous flow of sample from ambient air. The suction pump operational status should also be connected to the computer as a separate channel.</p>
11	<p>19" RACK</p> <p>Suitable 19" Rack cabinet to accommodate all analyzers, calibrators, Zero air generators, data logger etc. The dimension of the rack without doors, with aluminum section and rear of 2 mm steel sheet, one removable roof plate, fitted with 4 filling eyebolts. Four roof fixing screws included in package to replace the lifting eyebolts. One gland plate three-part, one pair of 475 mm (19") mounting angles depth adjustable in 25 mm pitch pattern fitted on two fixing angles approximately 150 mm unit from the front standard. To accommodate panel width of 19" size: width = 600 mm, Height = 1400 mm and Depth = 800 mm. The 19" racks should be screwed to the floor of the station with anti-vibration pads. All nuts and bolts shall be cadmium coated. Including Latest Updates.</p>
12	<p>SPLIT AIR CONDITIONER (1.0 TON CAPACITY)</p> <p>Type & Capacity: 1 No. split type, 1 ton cooling only capacity Inverter AC, roof mounted of 5 star rating with an automatic timer. Separate Automatic Voltage stabilizer will be provided with each unit.</p> <p>The indoor units should be running alternately at an interval of four hours with timer control and the temperature inside the station should be maintained at 25°C inside during</p>

	<p>peak summer months.</p> <p>a) Cooling Capacity:3400 W</p> <p>b) Star Rating: BEE 5 star Inverter with Cooper Coil</p> <p>c) Indoor Noise Level 40-50 dbA</p> <p>d) Control Type: Remote</p> <p>e) Compressor: Inverter</p> <p>f) Refrigerant: Eco Friendly</p> <p>g) Feature: filter clean Indicator, Pre-coated Aluminium fins etc.</p> <p>h) Power supply: 230 volts \pm 10volts AC and 50 Hz \pm 3%.</p> <p>i) Standard Warranty</p> <p>j) Remote: LCD Wireless.</p>
13	<p>SPLITAIR CONDITIONER (2.0 TON CAPACITY)</p> <p>Type & Capacity: 2 Nos. split type, 2 ton cooling only capacity Inverter AC, roof mounted of 5 star rating with an automatic timer. Separate Automatic Voltage stabilizer will be provided with each unit. The indoor units should be running alternately at an interval of four hours with timer control and the temperature inside the station should be maintained at 25^oC inside during all the time including peak summer months.</p> <p>(i) Cooling Capacity:7000 W</p> <p>(ii) Star Rating: BEE 5 star Inverter with Cooper Coil</p> <p>(iii) Indoor Noise Level: 40-50 dbA (cooling)</p> <p>(iv) Control Type: Remote</p> <p>(v) Compressor: Inverter</p> <p>(vi) Refrigerant: Eco Friendly</p> <p>(vii) Feature: filter clean Indicator, defrosting Sensor</p> <p>(viii) Power supply: 230 volts \pm 10volts AC and 50 Hz \pm 3%</p> <p>(ix) Standard Warranty</p> <p>(x) Remote: LCD Wireless.</p>

14	<p>ONLINE UPS 10 kVA, CAPACITY (Three Phase I/P & Single Phase O/P, with 01 hours backup) (for Air Conditioner)</p> <p>Three phase 10 kVA UPS along with Automatic Delayed Restoration Device (ADRD) with 1 hour backup in full capacity should be provided for the smooth operation of one 2 Ton capacity split AC at the station. Automatic Phase Sequencer Device has to be installed along with the UPS.</p> <p>a) Capacity : 10.0 kVA</p> <p>b) Technology : PWM using IGBT / MOSFETS</p> <p>c) Crest Factor : More than 3: 1</p> <p>d) Input Voltage : 415 V AC, Voltage Range : $\pm 25\%$, Frequency : 50 Hz $\pm 3\%$</p> <p>e) Output Voltage : 230 V AC, Voltage regulation : $\pm 1\%$, Frequency : 50 Hz Frequency regulation : $\pm 0.01\%$, Waveform : Pure sine wave</p> <p>f) Battery type : Sealed maintenance free Back up time : 1 Hour at full load Battery Capacity : For required backup time Recharge time : 5 hrs to 90% after complete discharge</p> <p>g) Distortion : Less than 1% on linear load</p> <p>h) Power factor : 0.9 to 1</p> <p>i) Indicator : L.E.D. – Battery Charge, Load level, on Line, over load, on battery, replace battery</p> <p>j) Alarm : Audible alarm for battery backup, battery low, and fault</p> <p>k) Protections Surge : Surge suppression meets BIS or International standard Overload : Fuse & current limited Short circuit : Fuse & current limited & cut – off Battery low cut – off : No battery drain after cut - off</p> <p>l) Overload Capacity : 110% for continuous load</p> <p>m) Efficiency : More than 90%</p> <p>n) Environment Operating Temp. : 0 – 50 C Operating Hum. : 10% to 95% (Non condensing) Audible Noise : Less than 45 db (at 1 meter)</p>
	<p>ONLINE UPS 5 KVA, CAPACITY (Single Phase I/P & Single phase O/P, with 02 hours backup) (01 for Analyzers & 01 for Server at Central Station) :-Single phase 5 kVA UPS along with Automatic Delayed Restoration Device (ADRD) with 2 hours backup in full</p>

	<p>capacity should be provided for the smooth operation of Analyzers and peripherals at the station:</p> <p>3.2.1 Capacity : 5.0 kVA</p> <p>3.2.2 Technology : PWM using IGBT / MOSFETS</p> <p>3.2.3 Crest Factor : More than</p> <p>3: 13.2.4 Input Voltage : 230 V AC, Voltage Range : $\pm 25\%$, Frequency : 50 Hz $\pm 3\%$</p> <p>3.2.5 Output Voltage : 230 V AC, Voltage regulation : $\pm 1\%$, Frequency : 50 Hz Frequency regulation : $\pm 0.01\%$, Waveform : Pure sine wave</p> <p>3.2.6 Battery Battery type : Sealed maintenance free, Back up time : 2 Hours at full load Battery Capacity : For required backup time, Recharge time : 5 hrs to 90% after complete discharge</p> <p>3.2.7 Distortion : Less than 1% on linear load</p> <p>3.2.8 Power factor : 0.9 to 1</p> <p>3.2.9 Indicator : L.E.D. – Battery Charge, Load level, on Line, over load, on battery, replace battery</p> <p>3.2.10 Alarm : Audible alarm for battery backup, battery low and fault</p> <p>3.2.11 Protections Surge : Surge suppression meets BIS or International standard Overload : Fuse & current limited, Short circuit : Fuse & current limited & cut – off Battery low cut – off : No battery drain after cut - off,</p> <p>3.2.12 Overload Capacity : 110% for continuous load</p> <p>3.2.13 Efficiency : More than 90%</p> <p>3.2.14 Environment Operating Temp. : 0 – 500 C, Operating Humidity : 10% to 95% (Non condensing), Audible Noise : Less than 45 db (at 1 meter)</p>
15	<p>Weather Monitoring Station / METEOROLOGICAL, FLOW AND ELECTRONICS CALIBRATION etc.,. (The supplier should provide calibration devices or calibration check devices for all the meteorological parameters namely temperature, wind speed, wind direction, relative humidity, solar radiation, rain fall as per the specifications of the manufacturers.)</p> <p>METEOROLOGICAL SYSTEM</p> <p>The meteorological instrumentation should be interfaced directly with the Data Acquisition System after passing through a lightning protection isolation box. A crank - up telescopic 10 meters tower should be erected for mounting of meteorological sensors. The relative humidity and solar radiation sensors should be mounted on the</p>

tower. The specifications are as follows:

(A) WIND SPEED

Range (Operation) : 0 – 60 m/s or better, Sustainability : Upto 75 m/sec, Accuracy : ± 0.5 m/sec or better, Resolution : 0.1 m/sec, Sensor Type : Ultrasonic, Threshold : 0.5 m/sec or less, Response time : 10 sec or better

(B) WIND DIRECTION

Range : 0 – 359 degree, Accuracy : ± 3 degree or better, Resolution : 1 degree, Sensor type : Ultrasonic, Threshold : 0.5 m/sec or less, Response time : 10 sec or better

(C) AMBIENT TEMPERATURE

Range : -10 o C to 60 o C, Accuracy : ± 0.2 o C or better (with radiation shield), Response : 10 seconds in still air, Resolution : 0.1 °C, Sensor type : Resistance type
Response time : 10 sec or better.

(D) RELATIVE HUMIDITY

Range : 0 to 100% RH, Accuracy : ± 3.0 % or better, Resolution : 1%, Sensor type : Capacitive / Solid State, Response Time : 10 sec or better

(E) SOLAR RADIATION

Range : 0 to 1500 W/m² or better, Accuracy : ± 5.0 % or better, Resolution : 5W/m²
Sensor type : Silicon Photo diode

(F) RAINFALL

Range : 0.2 mm to 100 mm /hr, Accuracy : $\pm 5\%$ or better, Resolution : 0.2 mm
Sensor type : Tipping bucket rain gauge or any other suitable sensor, Response Time : 10 sec or better.

(G) TELESCOPIC CRANK – UP METEOROLOGICAL TOWER

The wind speed, wind direction, temperature, relative humidity and solar radiation sensors are to be mounted on the Meteorological Tower. The tower is to be a free standing four section telescopic tower provided with a hand crank to raise and lower the instruments mounted on the tower. Specifications are as follows:

Extended Height : 10 meters, Retracted Height : 2 metres, Wind load Limit : 0.7896 sq. m. (8.5 sq. ft) at 50 mph, Number of Sections : 4, Construction material : Galvanised steel or aluminum.

Note:

(i) Humidity and temperature sensors are to be supplied with weather and thermal radiation shield made of anodized aluminum and sensor should be supplied with all

	<p>necessary cables, connector and mounting arrangements as required.</p> <p>(ii) All the meteorological sensor should be certified/ traceable to World Meteorological Organization (WMO) and software should also have certification from the appropriate international agency or as Directed by Engineer in Charge.</p>
16	<p>Data Acquisition and Handling System at Station;</p> <p>System comprises of station computer with DAS facilities.</p> <p>Data logger/DAS with 8 analog, 24 digital inputs. Ability to log channels at different intervals and should have capability of averaging and displaying real time data and averaged data over a period of 1 min, 15 min, ½ hr, 1 hr, 4 hrs, 8 hrs, 24 hrs, 1 month and year. Communication between data logger and station computer should be using standard USB/RS232/RS485/ Ethernet Connector. The data logger should have internal battery with charger and if it is PC based UPS serves the purpose.</p> <p>The data logger/DAS should support LAN and Internal GSM modem/ Wifi for data transfer to central server. Station computer for data logging will be in addition to workstation computer required for calculating AQI, and will be of same or better specifications that of work station computer.</p> <p>The supplier is supposed to install Computer System along with DAS of suitable high- end specification as per the design & specifications of DAHS. Real Time Data to be simultaneously transmitted from station computer to Central Servers at respective KSPCB and CPCB.</p> <p>Computer:</p> <p>Brand new Computer of reputed make like HP, Dell, Lenovo, Compaq, IBM, Acer, Apple, Microsoft of configuration mentioned in the item "Work Station Computer for AQI" or better and compatible with DAHS to be supplied.</p> <p>WORK STATION COMPUTER FOR AQI</p> <p>This has to be installed at CAAQM station for the preparation of AQI along with the station computer.</p> <p>This PC would be controlled through remote mechanism with CPCB for the purpose of installation & maintenance of AQI Software. The supplier will maintain the Computer System (Hardware, OS, etc.)</p> <p>Sr. No Specifications</p> <p>1). CPU Intel® Core i7 8th generation or higher,</p>

	<p>2). Memory 8 GB DDR-IV, or better</p> <p>3). Ethernet ports Integrated intel ® Ethernet LAN 10/100/1000,</p> <p>4 PCI Slots Two PCIe16 half height</p>
	<p>5 Optical Drive DVD R/W Internal</p> <p>6 HDD's 3.5" 1TB, SATA drives</p> <p>7 Power Supply Standard suitable power supply</p> <p>8 Key board Optical Keyboard same as OEM</p> <p>9 Mouse Standard Optical Mouse same as OEM</p> <p>10 I/O ports Minimum 6 USB (at least 4 ports of 3.0)</p> <p>11 Monitor 22" Wide or higher LED FHD Color Monitor</p> <p>12 Wireless adapter USB Wireless adapter x 1 no.</p> <p>13 OS support Open source Linux CentOS</p> <p>14 Warranty Warranty on site OEM warranty – comprehensive</p> <p>15 Type Desktop (Flat)/Tower REMOTE MONITORING TOOL/SOFTWARE Remote calibration & validation management software and its licenses for the entire project duration for stations computer and central servers located at KSPCB and CPCB. Data Acquisition Software (DAS) & it's licenses to be provided for Central Servers at each KSPCB and CPCB. The remote connectivity tool/software like Team viewer with License, procurement, installation & updating for the complete duration for each SPCB & CPCB, is to be done by the supplier.</p> <p>PRINTER SPECIFICATIONS</p> <p>COLOUR Laser Jet Multi-Function Printer (Print-Scan-Copy)</p> <ul style="list-style-type: none"> • Print speed black: 25 ppm min • Print Speed Colour : 5 ppm min • Scanner • Resolution: 1200 x 1200 dpi • Processor speed 1200 MHz Print or better • Paper handling input, standard 250-sheet input tray or better • Duplex printing Automatic (standard) • Media sizes supported A4 A5

	<ul style="list-style-type: none"> • Wireless connectivity and automatic two-sided printing • automatically connect to wireless network, • Easily print from virtually anywhere in the office with Ethernet and wireless connectivity • Connect via USB, and access tools from PC to manage printer. • 1,500-page toner cartridge or better
17	<p>DATA ACQUISITION SOFTWARE FOR STATION (CAAQM)</p> <p>The software captures data from all channels in the system and stores in the station Computer.</p> <p>(i) Data Acquisition</p> <p>a) Frequency of data acquisition</p> <p>i) User selectable 1,5,30,60,120 second averaging duration online digitally.</p> <p>ii) Minimum frequency will be subject to capability of analyzer cycle.</p> <p>b) Channel size</p> <p>i) 32 Channels or more supported</p> <p>ii) Expandable to 64 channels, if required in future.</p> <p>c) Data input</p> <p>Either Analog (0-1 volt/0-10 volt/2-20mA/4-20mA) or Digital to configure with the PC. The condition is that system should remotely operatable.</p> <p>d) User configurable channels, stations and equipment with communication parameters.</p> <p>e) Analyzer data channel should comprise of Name, Units, Communication Address, Validity Range, Operation and Error Status.</p> <p>f) Provision to incorporate conversion factors such as PPB to $\mu\text{g}/\text{m}^3$ etc.</p> <p>g) Software should be equipped to configure the analyzers with it, irrespective of company make and communication protocol of the analyzer and the output mode i.e. Analog or Digital (RS 232) of the instrument.</p> <p>h) The output should be provided in user defined units.</p> <p>(ii) Data Collection</p> <p>a) Average data over user selectable time (1,5,30,60 seconds time interval) period.</p> <p>b) Operational status, Error status, calibration status and calibration values observed from the analyzer should be captured and should be made available along with the data with a frequency of maximum five minutes.</p>

	<p>c) System should collect of the diagnostics of the instrument comprising actual diagnostics parameters and their values at least once in every five minute to check the state of the health analyzer.</p> <p>i) Provision to entering zero calibration, span calibration values of gas cylinder/permeation to devices</p>
	<p>ii) Provision for collecting zero calibration, span calibration values (pre calibration & post calibration) in to the database for further analysis.</p> <p>iii) Provisions to collect electronic system pre calibration & post calibration values from the analyzer to ascertain the percentage deviation/ correction applied during each calibration and record it in database at station & Central computer.</p> <p>(iii) Data Storage</p> <p>a) Data along-with diagnostic, calibration, alarms should be stored at station computer at a defined path.</p> <p>b) Interval of data dumping will be same as defined in the data collection.</p> <p>c) System should be capable to keep every second acquired data from 32 channels for a period of minimum five years.</p> <p>d) Current data should be stored as per ISO-7168-1:1999I format and should be available in folder named as c:\Data\ at an interval of 15 minutes. As an example c:\data\01.05.2015.xml. the file will be appending without double data entry and as per ISO format.</p> <p>e) Data should also be stored for last two years in E:\data\Year\Month\day i.e. e:\data\2015\05\01.05.2015.xml</p> <p>f) If data encryptionis done, then decryption procedure should be made available in soft file format to check the data at station at any point of time. To convert data on continuous basis for exporting to AQI software, procedure should be available without any licensing. AQI calculating Software will be provided by CPCB/SPCB.</p> <p>(iv) Data Display (Statistical analysis of data)</p> <p>a) Main window for real time display of all measured parameters with status of all analyzers/sensors.</p> <p>b) In 4-in-4 graphs and4-in-1 graph formats</p> <p>c) In tables of 4-in-1 format</p> <p>d) Real time multi – graphs over user selectable time period i.e. 6.00 AM to 6.00 AM etc.</p>

	<p>e) Display of graphic & tabular display of the current data.</p> <p>f) Graphical form should comprise of 4-4 graphs, 4-1 graphs in user defined format (1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly; user definable time series)</p> <p>g) Tabular form should comprise of 4 channel list in user defined format (1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly; user definable time series)</p> <p>h) Station instruments basic configuration etc. should be visible on screen continuously.</p> <p>i) Statistical analysis tools like regression analysis, co-relation analysis and other analysis as per industry standards in the field of environment should be available and if not the firm should develop these for CPCB within a time frame of six months.</p>
	<p>.j) The system should have procedures for normal analysis tools like calculation of data with respect to a threshold value, average, minimum, maximum, calculation of violating value with respect defined values(National Air Quality Standards) for defined period for the database etc.</p> <p>k) Data analysis of diagnostics parameters</p> <p>l) Data analysis of Pre calibration and post calibration data (if facility not available, should be developed within six months)</p> <p>m) Data analysis of corrections applied of each calibration cycle (if facility not available should be developed within six months)</p> <p>(v) Data Backup</p> <p>a) There should be defined data backup procedure through which data can be extracted from station computer in simple text format/excel/ ISO format(user definable).</p> <p>b) There should be defined restore procedure also to restore the data in case of data loss.</p> <p>c) A display screen should be available to update the user about data availability</p> <p>(vi) Data Validation automatic checks at station software.</p> <p>a) Zero level and span level checks if performed cyclically and defined results are not obtained up to +/- 5%(user definable 0-10%) then system should alarm the user of system failure and the recorded alarm should be transmitted to central software.</p>
	<p>b) After instruments perform the calibration the results obtained should be recorded and should be transmitted to central computer.</p> <p>c) There should be provision of two databases one is raw database and another corrected database.</p> <p>d) Validation of data through calibration database Pre calibration & post calibration values collected.</p>

(vii) Calibration of systems

- a. Calibration window for analyzer for the calibration from computer.
- b. Remote Access to Calibration: Calibration exercise need to be done remotely. All necessary arrangements for it should be made in the system.
- c. Calibration data file may be prepared separately and data should be excluded from the database
- d. Calibration database need to be formed, stored and transmitted to central server.
- e. Calibration cycles to be as per the models of the instruments.
- f. Calibration records should store the calibration values displayed by instrument.
- g. Diagnostics during calibration should also be recorded.

(viii) Location of station

- a) Fixed and Mobile Stations location to be recorded and North correction feature should be available.
- b) Latitude and longitude of stations be recorded

(ix) Data transfer to Central

All data captured at station computer should be transferred to central software.

- a) User selectable time frame for transmission of data to central server.
- b) Diagnostics (actual diagnostics parameter values recorded each time in the station), configurations (station channel configurations), alarms (generated alarms) should be transmitted.

(x) Data transfer to Display Boards at Public site

Soft-ware should have provisions to connect data output including current pollutants concentration, AQI, advertisement, etc. to the display boards (LEDs), to be installed at public site. For the purpose Data display device has been recommended in the document.

11. DATA ACQUISITION SOFTWARE AT THE CENTRAL STATION EACH at KSPCB & CPCB

Data communication system handles the data transmission of an ambient air quality network and receives incoming messages / signals from remote stations. The central software processes signals and data and displays it. Detailed requirement is as below:

A (i) Software at Central Station.

- a) Software should not have any restriction on number of locations and computers either technologically or in terms of licensing.
- b) Should display multiple stations on – line data (momentary values) in tabular text and

graphic format.

c) Data should be received by the central from all locations maximally within 5minutes duration or at user defined time intervals.

d) Data along-with diagnostics and calibration details should be transmitted at central from all connected locations.

e) Should support dialup systems, broadband connectivity, wireless connectivity, 2G or 3G or any new technology which shall be in place during project time should be compatible and if not, need to developed by the system provider up- to project duration without additional charges.

f) Should have the remote-control facilities for calibrations (Zero & Span) of instruments and measuring range modifications.

g) Should have facility for displaying data communication error reports, image management which should be recorded and should be available for display.

(ii) Data Display at Central Station

a) In 4-in-4 graphs, 4-in-1 graph and/or 16-in-1 graph formats

b) In terms of 4-in-1 table format

a) Real time multi – graphs over user selectable time period i.e. 6.00 AM to 6.00 AM etc.

c) Display of graphic & tabular display of the current data like simple 3D line and column chart, polar diagnostics and 3D perspective column chart.

d) Graphical form should comprise of 4-4 graphs, 4-1 graphs in user defined format i.e. 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)

e) Tabular form should comprise of 4 channel list in user defined format i.e. 1, 5, 10, 15, 30 min, 1hour, 4, 8, 24 hour, 30 days and yearly. (user definable time series)

f) Display of data using selectable name of different stations.

g) Generation of Wind Roses, Pollution Roses (minimum 12 directional)with user defined time limits.

h) Calculate vector mean of wind direction.

i) Programmable downloading of data.

j) Comparison of data w.r.t. Standards in Graphical form and tabular form with information of values exceeds the Standards.

k) Specific data zooming facility

l) Database correction procedure

m) Separate user ID and Password for correction of database so that all regional level

users, if authorized, can validate their regions data and the events be recorded along with ID, date & time, on monthly basis.

n) Data validation trail recording.

(iii) Data Export

a) Data export in ISO 7168 format is required to be done automatically.

b) Possibility to export the data files in Excel, Text and other formats Tabular form should be in user defined format i.e. 1, 5, 10, 15, 30 min, 1 hour, 4, 8, 24 hour, 30 days and yearly.

(iv) Data Import

a) In case of communication medium fails there should a mechanism to shift the data into Pen drive (Physical medium for data collection) physically and a procedure to import the same on central software.

(v) Printing.

a) Possibility to connect different types of printers and auto printing facility for all displays generated throughout the analysis of data at any point of time.

(vi) Delayed data checks & Validation of data at Central Software at KSPCB.

a) After instruments perform the calibration the results obtained should be recorded and should be transmitted to central computer and stored.

b) Zero level and span level checks if performed cyclically and defined results are not obtained up to +/- 5% (user definable 0-10%) then system should generate alarm to the user for system failure and the recorded alarm should be transmitted to central software and stored. There should be provisions to read these alarms in a database for corrective actions and for comparison of data for acceptability or rejection.

c) Software utility should be provided through which validation of data could be done at SPCB and the validated data files be synced with database at CPCB.

d) The utility should provide date wise access to the data available in the station computer in the editable form along with provision to record events/remarks and should store in the database in the station computer as "Validated Data". However, the raw data should remain intact.

e) Validated files should also be stored in the stations computer in a folder at C:\Data\stationName\Datevalid.txt (Ex:C:\Data\NehruNagar\21062019valid.txt). This file format should be same ascsv file format as mentioned at Annexure-I.

(vii) Data display at CAAQM Locations and SPCB Office

	<p>(a) At CAAQM Station: A display board will have to be supplied & installed by the supplier at each CAAQM Station or nearby to it (may be few kilo meters) for which space to be provided by NMPA near Main gate.</p> <p>(b) At KSPCB Offices: A display board will have to be supplied & installed by the supplier at each KSPCB Office for which space to be provided by NMPA/KSPCB etc.</p> <p>(c) NMPA intends to show the content:</p> <ul style="list-style-type: none"> i) Information from External Sources ii) Information drawn from Internal databases iii) Advertisement in the form of Text, Slides, Charts, Videos etc. iv) Live Feeds <p>(d) Content Management System.</p>
	<p>Content Management for Data Display Boards is to be managed both locally & Centrally. Hence, the supplier is requested to provide software for local (at CAAQMS) & Central content management (at CPCB & KSPCB). The central software should be capable to operate simultaneously at KSPCB and CPCB. There could be two different software's at KSPCB / CPCB to manage contents of display boards of CAAQM Station & KSPCB Office. Therefore, Display Board Data Transmission Device (DBDTD) should be capable to collect the content from local station, KSPCB Central Software and CPCB Central Software manually through scheduling procedure for different durations (Minutes, Hours, Days, Weeks, Months, Years etc.), zone-wise, state-wise, group-wise, device-wise, content-wise separately as there will be of different contents to be displayed at different locations. The central software should have the capability of Remote machine status monitoring & management. It should be capable to provide on-screen display of remote display board (live screen of display board). Establishing the required connectivity by using necessary devices (either through LAN, Wi-Fi, GSM etc.) between the DBDTD and CPCB & SPCB to run the content seamlessly is within the scope of the supplier.</p> <p>(viii) Remote Procedures (if not available facility should be developed by the firm)</p> <ul style="list-style-type: none"> a) Central software should have capability to allow connecting any station computer through remote. b) Central software administrator should be able to go for remote calibration of any of the systems. c) Software should be capable to operate remote stations configurations. d) Control panel window should be available for controlling each analyzer that means each

	<p>analyser should be controllable separately through remote software being provided with the software system.</p> <p>e) Alarm window for valid alarms of all analyzers and sensors.</p> <p>f) It should have transparent data – connection to each analyzer from remote.</p> <p>g) System should be capable to remotely configure all stations through remote location using configuration file to maintain the uniformity. The configuration command from central at KSPCB location should be active.</p>
	<p>(ix) Data Reports Generation</p> <p>a) To prepare reports hourly, weekly, monthly, yearly in user defined interval and formats.</p> <p>b) Mean, Median, Percentile, Maximum, Standard deviation, Frequency analysis and Maximum Frequency analysis.</p> <p>c) Data Comparison. Software should be able to compare any of the four channels irrespective of type of data in the system with respect to each other on a single time scale user selectable.</p> <p>d) Data Comparison on different time scale. Software should be able to compare data on the basis of different time scales like one station (x) parameter (y) of one given date is compared with other station (z) parameter (y) on any other date in a single graph.</p> <p>e) Data reports, calibration reports and status reports with user time periods.</p> <p>f) Historic multi – curves / graphs over user selectable time period.</p> <p>g) Report generation over user selectable time period (instantaneous or averaged over a period of 1, 15, 30 min, 1 hr, 4, 8, 12, 16 and 24 hrs etc.).</p> <p>h) Diurnal variation, standard deviation, regression and other statistical parameter reporting possibilities with various available mathematical methods.</p> <p>i) If required separate report generation procedures have to be developed for which firm will be responsible for project duration.</p> <p>j) Daily report from each station should be generated and sent through email for hourly data of each parameter (including meteorological parameters, diagnostics of instruments and calibration of instruments if performed during that day) automatically format for which can be mutually agreed upon.</p> <p>k) Data should be downloadable in Excel Sheet, CSV format through user selection.</p> <p>l) Provision should be there to use raw as well as validated data for generation of all types of graphics including windroses and pollution roses.</p>

	<p>B. SECURITY</p> <p>a. Software should be totally secured with protection against virus, malware etc.</p> <p>b. Security device like firewall for VPN Tunneling should be installed.</p>
	<p>C. OTHER TECHNICAL CONDITIONS</p> <p>1. Compatible Hardware required for data transmission through Data Display Connection Device has to be installed.</p> <p>2. Should support the latest formats of Windows 32 bit or 64 bit. Any new patches developed or upgraded software during project duration should be provided without additional cost.</p> <p>3. Manual of complete system should be provided.</p> <p>4. Firm should provide the hardware required for data acquisition along with all the software's required like OS, Networking software, Remote functionality software and should maintain hardware and software for project duration.</p> <p>5. All softwares like OS, Data Acquisition Software, Remote Calibration Software, Content Management Software etc. used for the entire project, should be either open source or with license. Copy of licenses should be provided to NMPA/KSPCB/CPCB.</p> <p>Note; The Following shall be provided by the New Mangalore Port Authority CONNECTIVITY FOR DATA TRANSFER including Monthly Rentals.</p> <p>A) LEASED LINE CIRCUIT</p> <p>1Mbps capacity leased line connectivity with 99% uptime service level agreement (SLA) to be provided by the firm at each station location. The leased line may be provided on copper or optical fiber or through RF depending upon the location. 04 nos. of Real IPs to be obtained along with the Lease Line Circuit. Router equipped with 01 WAN Port and minimum 08 LAN Ports is to be procured along with the Leased Line Circuit.</p> <p>B) BROADBAND</p> <p>1Mbps capacity broadband connectivity from other than one already providing leased line connectivity shall be provided by the firm at each station.</p>
	<p>C) GSM /Hotspot Connectivity</p> <p>Internet connectivity will have to be provided by the firm for the entire project duration at LED location either using GSM or Hotspot connectivity.</p> <p>DATA ACQUISITION SOFTWARE AT THE CENTRAL STATION EACH at KSPCB & CPCB</p> <p>Data communication system handles the data transmission of an ambient air</p>

	<p>quality network and receives incoming messages / signals from remote stations. The central software processes signals and data and displays it. Detailed requirement is as below:</p> <p>A (i) Software at Central Station) Software should not have any restriction on number of locations and computers either technologically or in terms of licensing.</p> <p>b) Should display multiple stations on – line data (momentary values) in tabular text and graphic format.</p> <p>c) Data should be received by the central from all locations maximally within 5minutes duration or at user defined time intervals.</p> <p>d) Data along-with diagnostics and calibration details should be transmitted at central from all connected locations.</p> <p>e) Should support dialup systems, broadband connectivity, wireless connectivity, 2G or 3G or any new technology which shall be in place during project time should be compatible and if not, need to developed by the system provider up- to project duration without additional charges.f) Should have the remote control facilities for calibrations (Zero & Span) of instruments and measuring range modifications.</p>
	<p>j) Daily report from each station should be generated and sent through email for hourly data of each parameter (including meteorological parameters, diagnostics of instruments and calibration of instruments if performed during that day) automatically format for which can be mutually agreed upon.</p> <p>k) Data should be downloadable in Excel Sheet, CSV format through user selection.</p> <p>l) Provision should be there to use raw as well as validated data for generation of all types of graphics including wind roses and pollution roses.</p> <p>B. SECURITY</p> <p>a. Software should be totally secured with protection against virus, malware etc.</p> <p>b. Security device like firewall for VPN Tunneling should be installed.</p>
18	<p>DISPLAY BOARD DATA TRANSMISSION DEVICE</p> <p>Sl. no Item Desc. Specifications</p> <p>1. PROCESSOR Intel® Corei5 equivalent Or Better</p> <p>2. Memory 6 GB, Memory slots for Micro SD or full size SD card slot with Memory support for at-least 8 GB</p> <p>3. Ports a. One HDMI</p> <p>b. LAN Port for Ethernet Network Connection</p>

	<p>c. Minimum of 3 USB Port with support for USB 2.0 or USB 3.0.</p> <p>4. OS Support Linux, or Windows OS</p> <p>5. Communication Options a. LAN Communication b. Wifi Communication – Wifi Hotspot enabled/ GPRS Comm. Enabled.</p> <p>S. N Item Desc. Specifications</p> <p>6. Power Supply 5 to 12 V DC through 220 V 50Hz AC Supply adapter or USB driven.</p> <p>7. Size Mechanical Chassis Size not to exceed 10" x 6"x 6" with stand alone tower/box.</p> <p>8. Operating Environment Operating Temperature 0° C to +50° C Humidity upto 90%</p> <p>9. Device Support 05 Years</p> <p>10. Antivirus It should be secured. If Windows, than licensed anti- virus should be there during the project duration.</p> <p>11. General Supplier will configure and deploy the communication mechanism. Complete manual of the device should be provided.</p> <p>12 Accessories 01 Meter HDMI Cable</p> <p>13. Internet To be provided by the vendor either through GSM SIM or through Wifi Enabled Dongles.</p> <p>14. Display Board should show Last data saved.</p> <p>15. Display board should show Last updated time should be displayed</p> <p>16 Software The vendor is responsible to provide software which can download the data from Station computer, AQI, Advertisements etc. store it and display on the Display Board seamlessly.</p>
19	<p>DAY LIGHT & NIGHT VISIBLE TRUE COLOR DATA DISPLAY SYSTEM</p> <p>(A) LOCATION NEAR TO CAAQM STATION</p> <p>1. Size of Display System (H X W) feet and Pixel 4 X 8 feet , P6, 6mm (+/- 0.5 mm) pixel pitch,</p> <p>2. Visibility Range ~10 Meters (Day time)</p> <p>3. Brightness 7000 NIT or higher</p> <p>4. Display of Colour Elements SMD 3535 or better</p> <p>5. Minimum Life span of the system LED Life 100000 Hours</p> <p>6. Viewing angle Viewing angle of 140o Horizontal/140o Vertical</p> <p>7. Operating and non-operating Temperature -15 to 550 C</p> <p>8. No of Color 281 trillion Colors , 256 brightness level dimming capability</p>

	<p>9. Data processing 16 bit data processing, 100 % Digital</p> <p>10. Scan rate and refresh frequency Scan Ratio 1:1 and with minimum 1920 Hz refresh frequency, 11. LED internal and External Cabinet type, Serviceability Internal LED frame should be made of Aluminum and External cabinet should be factory made without pin holes , LED Display should be serviceable from front and back.</p> <p>12. Color Temperature - Adjustable 4500 - 9000 K range</p> <p>13. Input Power Requirement/ Consumption 220 V, 50/60Hz , Power consumption 200 W (maximum) / m²</p> <p>14. Display Board Mounting Structure based upon location. Uni-Pole (05 meters) arrangement or Handing is in the scope of supplier</p> <p>15. General; The system should also have the facility to display the environmental picture through video camera/vcr/cd player etc. for public awareness.</p> <p>16. Power Cable Laying Depending upon location, cabling is to be done by the firm</p> <p>17. Device at Display Board to pick up data from stations and transmit it to LED Display. Display data connectivity device/system with GSM SIM has to be installed nearby LED board which will pick up data from station computer through Internet. LED to be placed away from through Internet. LED to be placed away from the station premises.</p> <p>18. Certification BIS, 19. IP Rating Display Module IP67, Cabinet IP 65</p>
20	Supply, Erection, Installation and Commissioning of Structural work for Display Board (Max. Height 5 Feet) from Ground in main gate.
21	Charges for Installation & Commissioning of the CAAQMS System at site.
22	Charges for the spares / Consumables and gas refilling during the Operation and Maintenance Contract of 5 years which recons from the date of completion/Commissioning of the subject work.
23	<p>Charges for Deploying One operator (Graduate Engineer/Diploma Engineer) in each shift during Operation and Maintenance Contract for 5 years after commissioning of the CAAQMS System (Comprehensive Maintenance).</p> <p>Note: The weekly Off of Both the persons shall be staggered since the system has to work all 365 days of a year(one person in each shift round the clock)</p>

Note:

The Installation and commissioning of the CAAQMS Station shall be complying with the "TECHNICAL SPECIFICATIONS FOR CONTINUOUS AMBIENT AIR QUALITY MONITORING (CAAQM) STATION (REAL TIME) recommend by the "Central Pollution Control Board" Enclosed in the Tender Document.

All ambient gas analyzers shall be approved by the USEPA / TUV. However, in case of BTEX Analyzer, it shall be approved by USEPA/TUV/MCERT. For Ammonia Analyzer specifications as given will be considered.

Method of measurement used shall also comply with the stipulation on National Ambient Air Quality Standards (NAAQS) 2009

The analyzers should be 19" rack mounting model with facilities for fixing the analyzers from front side. The front panel preferably has ON / OFF Switch. The analyzer must have zero-point internal calibration system and in agreement with minimum detection limit of each analyzer. Each set of analyzers shall be supplied with two copies of elaborate operation manuals comprising details as below:

Parts (I) should comprise installation, operational and troubleshooting details;

Parts (II) should have details about preventive, routine and corrective maintenance;

Parts (III) should comprise details of all electrical, electronic and pneumatic circuit diagrams, details of each spare parts, catalogue No. etc. and details of each electronic card / PCB's; and

Parts (IV) Schematic diagram for possible repair & maintenance.

Parts (V) Standard Operating Procedure (SOP) for each analyzer.

Parts (VI) List of equipments and other accessories along with contact details of supplier.

(VII) Multi drop RS 232 port shared between gas Analyzers, Dust Analyzer (PM2.5& PM10), Meteorological Sensors and computer for data, status and control. Communication should have a USB port,

NOTE; (C) Protocol for Data Transmission from CAAQM Stations

Presently CPCB is operating NAQI network which uses this protocol mentioned below for the data collection at central server to generate NAQI which is made available to the public. The Instrument Supplier will have to generate the data output immediately after installing the CAAQMS at any location in this format so that station gets integrated into the existing system immediately.

However, the proposed procedure given in this document of data management through ISO 7168 format would be applied after proper system checks and setup. In parallel both

systems will be operated for nearly six months and finally, ISO based system will be adopted for future data management from CAAQMS in the entire country.

1. Data Format

Data file on real time basis having 15 minutes average values in a prescribed format attached at Annexure-I should be generated at the station for which Instrument Supplier is responsible. File should be updated after every 15 minutes.

Data intervals like 00:15, 00:30, 00:45, 01:00 should be fixed at the station.

Station file name should be exactly as the name of the station to be displayed on the web portal. i.e. NMPA, Panambur. Here precaution is to be taken that no space between words should be given or no special characters should be used.

File should be recorded in a folder c: \data \ data.txt.

File should allow data appending sequentially.

Date of last file record appended in the file should be recorded and data afterwards be placed in the data file.

File appending should continue subject to max 97 lines. First in First out mechanism shall be followed in keeping file size to 97 lines.

Hence, in the specified folder c:\Data\ there will be a single file which will keep appending as per format attached. Duplicate entry of any data should not be made in the file.

System should have capability to create previous record data file for which user will give the date. This is required to have lost data makeup in the final database, if any.

2. Data Mapping

Protocol for each parameter is fixed as below:

1. 15 Minutes average value will be provided by the operator of the CAAQMS
2. Each SPCB will have the parameter as mentioned in the table only. Not even a small gap or space is provided other than the mentioned table is acceptable.

3. Standard Parameter Naming Protocol and Conversion factors Table

Parameters Name	Parameter Abbreviations	Unit	Conversion factors
at 25°C, Rack Temperature	Temp	°C	
Carbon Monoxide	CO	mg/m ³	1ppm=1.145mg/m ³ ,
Sulphur Dioxide	SO ₂	µg /m ³	1ppb=2.62 µg/m ³
Nitric Oxide	NO	µg /m ³	1ppb=1.23 µg/m ³ ,
Nitrogen dioxide	NO ₂	µg /m ³	1ppb=1.88 µg/m ³ ,
Oxides of Nitrogen	NO _x	Ppb,	
Ozone	Ozone	µg /m ³	1ppb=1.96 µg/m ³ ,
Particulate Matter less than PM ₁₀	µg /m ³ , 10 Micron size,		
Wind Speed	WS	m/s,	
Wind Direction	WD	Deg,	
Ambient Temperature	AT	°C	--

Relative Humidity RH % , Barometric Pressure BP mmHg, Solar Radiation SR W/mt2, Rain Fall RF Mm, Vertical Wind Speed VWS Degree --

Particulate Matter less than, 2.5 micron size PM2.5 $\mu\text{g}/\text{m}^3$, Benzene Benzene $\mu\text{g}/\text{m}^3$

1ppb=3.19 $\mu\text{g}/\text{m}^3$, Toluene Toluene $\mu\text{g}/\text{m}^3$ 1ppb=3.77 $\mu\text{g}/\text{m}^3$,

Xylene Xylene $\mu\text{g}/\text{m}^3$ 1ppb=4.34 $\mu\text{g}/\text{m}^3$, Ethyl Benzene Eth-Benzene 1ppb=4.34 $\mu\text{g}/\text{m}^3$,

M+P_Xylene MP-Xylene 1ppb=4.34 $\mu\text{g}/\text{m}^3$, Methane CH4 $\mu\text{g}/\text{m}^3$ 1ppb=0.65 $\mu\text{g}/\text{m}^3$, Ammonia

NH3 $\mu\text{g}/\text{m}^3$ 1ppb=0.70 $\mu\text{g}/\text{m}^3$, Formaldehyde HCHO $\mu\text{g}/\text{m}^3$ 1ppb=1.23 $\mu\text{g}/\text{m}^3$, Mercury Hg

$\mu\text{g}/\text{m}^3$ 1ppb=8.20 $\mu\text{g}/\text{m}^3$

Note: 1. Any other parameter can be added with the prior approval of IT Division ONLY.

4. Internet Connectivity

Internet connectivity should be available on 24X7 basis for data transmission with an uptime of 99.9%. For this purpose every CAAQM station should have two kinds of connection:

i) Leased Line Circuit of at least 01 Mbps capacity

ii) Broad Band connectivity through telephone line. Both facilities should be configured in ready to use condition. If possible auto failover should be created.

Note: Connectivity through Data card is not acceptable except in any special circumstances, where both of these types of connectivity's are not available. For such case CPCB IT Division shall be consulted before taking a final decision.

5. Other Information:

1. Area Map showing station location

2. Latitude, Longitude and altitude of the station

3. Photo of station along with nearby areas

4. One page write-up about the station activities in the vicinity of station including major pollution sources like nearby road, rail, restaurants, generator sets, etc.

Annexure I

File Name: sanathnagar, 1,2,3,4,5,6,7,8,

Station name, Parameter, Date from, Date to, Value, calibration flag, maint flag, Remark,

Pamnambur,CO,27-04-2015 13:00,27-04-2015 13:15,0.2497,0,0,analyserfaulty,

Pamnambur,C0,27-04-2015 13:15,27-04-2015 13:30,0.2470,0,0,analyserfaulty,

Pamnambur ,C0,27-04-2015 13:30,27-04-2015 13:45,0.2470,0,0,analyserfaulty,

Pamnambur ,C0,27-04-2015 13:45,27-04-2015 14:00,0.2470,0,0,analyserfaulty,

Pamnambur,Ozone,27-04-2015 13:00,27-04-2015 13:15,59.6710,0,0,flowproblem,

Pamnambur ,Ozone,27-04-2015 13:15,27-04-2015 3:30,59.5960,0,0,analyserfaulty,

Pamnambur ,Ozone,27-04-2015 13:30,27-04-2015 3:45,59.5960,0,0,analyserfaulty,
 Pamnambur ,Ozone,27-04-2015 13:45,27-04-201514:00,59.5960,0,0,analyserfaulty,
 Pamnambur NO,27-04-2015 13:00,27-04-2015 13:15,0.5922,0,0,analyserfaulty,
 Pamnambur,N0,27-04-2015 13:15,27-04-2015 13:30,0.4435,0,0,0,
 Pamnambur ,N0,27-04-2015 13:30,27-04-2015 13:45,0.4435,0,0,0,
 Pamnambur,N0,27-04-2015 13:45,27-04-2015 14:00,0.4435,0,0,0,
 Pamnambur,So2,27-04-2015 13:00,27-04-2015 13:15,3.5233,0,0,0,
 Pamnambur,So2,27-04-2015 13:15,27-04-2015 13:30,3.7278,0,0,0,
 Pamnambur,So2,27-04-2015 13:30,27-04-2015 13:45,3.5233,0,0,0,
 Pamnambur,So2,27-04-2015 13:45,27-04-2015 14:00,3.7278,0,0,0,
 Pamnambur r,RT,27-04-2015 13:15,27-04-2015 13:30,33.2260,0,0,0,
 Pamnambur,RT,27-04-2015 13:30,27-04-2015 13:45,33.2240,0,0,0,
 Pamnambur AT,27-04-2015 13:45,27-04-2015 14:00,33.0960,0,0,0,
 Pamnambur,AT,27-04-2015 14:15,27-04-2015 14:30,33.3740,0,0,0,
 Pamnambur,RH,27-04-2015 13:15,27-04-2015 13:30,41.3080,0,0,0,
 Pamnambur,PM10,27-04-2015 13:15,27-04-2015 3:30,30.3000,0,1,analyserfaulty,
 Pamnambur ,PM10,27-04-2015 13:30,27-04-2015 13:45,30.3000,1,0,analyserfaulty,

Please note: Here 0-zero stands for normal operation of instruments in calibration flag status 1-
 Stands for calibration mode ON and data will not be considered for averaging purpose. Same is
 true for Maintenance mode where 0-normal and 1 maintenance mode ON.

A. SCOPE OF WORK & TECHNICAL SPECIFICATIONS**1. Scope of Work to be undertaken by identified bidder:**

The identified bidder should undertake following activities:

1. Supply, installation and Commissioning of one set of CAAQMS Equipment
2. Operation and Maintenance of the CAAQMS Equipment for a period of 5 years from the date of its the commissioning including calibration, electricity, internet, manpower, security, data reporting.
3. Daily reporting of data pertaining to Ambient Air Quality to KSPCB/NMPA
4. On line transfer of data to NMPA/ KSPCB & up linking of data to website of KSPCB & CPCB.

NMPA would provide land for installation of CAAQMS free of cost to the L1 Successful Bidder. Along with the land, NMPA would provide electricity connection on payment of charges /deposit after getting approval from NMPA, at the proposed location facilitating the installation at the site. The monthly/recurring cost pertaining to monthly telephone and electricity bill would be borne by the Successful Bidder under the O&M of the station.

A data display system with Day light & Night visibly system has to be supplied, installed and maintained initially for five years. NMPA/KSPCB would identify location for installation of Day light & Night visible data display system. The L1 successful bidder has to make arrangement for telephone and electricity connections at the identified location. The L1 successful bidder will bear the initial installation cost for these facilities and the monthly/recurring cost pertaining to their usage (monthly telephone and electricity bill). However all other installation requirements for Display System are to be arranged by the successful bidder and cost for same should be included in bid price.

All the necessary arrangement and adjustment for suitable installation and operation of the equipment shall be made by the Bidder. However, NMPA shall arrange for the following and Identified bidder shall guide and assist the NMPA:

- a. The NMPA shall identify and hand over the site for erection & commissioning of Air Monitoring Stations free from all encumbrances.
- b. The L1 successful bidder will make the arrangement for electricity & telephone connection at the site along with monthly charges for both electricity and phone bill shall be borne by the Identified bidder as instructed by the Engineer in Charge.

B. DESIRED OUTPUT FOR CAAOMS EQUIPMENT

The desired output requirement from the CAAQMS equipment to be installed at are given in this document.

C. DATA MANAGEMENT AND QUALITY CHECKS

Data shall be collected and validated according to USEPA standards/National Ambient Air Quality Standards using the methodologies included in 40 Code of Federal Regulations all analysers shall have current USEPA reference or equivalent method designation and shall be of the latest design. Successful bidder shall submit a Standard Operating Procedure for the air quality monitoring station to the NMPA before award of contract. This Standard Operating Procedure shall be approved by the NMPA/KSPCB prior to award.

The Standard Operating Procedure shall contain the following:

- i. Operating procedures for all analysers and meteorological sensors Calibration procedures Calibration schedule Maintenance procedures maintenance schedule Data validation procedures.
- ii. Data obtained from these calibration checks and copies of associated Quality Assurance and calibration documentation, shall be submitted to NMPA along with the Air Quality Data.
- iii. Up on 24 hour notice from the NMPA/KSPCB/CPCB once per year, Successful Bidder shall agree to submit to an audit of calibrations, conducted, using pre- approved USEPA methodologies, by a third party. Third party audit will be arranged by the L1 Successful Bidder with the approval of NMPA, the cost shall be paid by the bidder. The bidder shall provide all necessary arrangements to carryout required audit. The result of these audits shall be made immediately available to both the Seller and Buyer.
- iv. Operator shall participate in Proficiency Testing Exercise organized by reputed organization.

D. LOCATION**CAAQM Stations**

SL.No.	Area	City	No. of CAAQMS
1	New Mangalore Port , Panambur	Mangalore	01

SUPPLY OF EQUIPMENT

Attachment – 1, specifies the list of equipment in the package, quantity of equipment to be supplied, delivered and installed.

E. Technician PROVISION OF TRAINING

The identified bidder shall provide three phase training for one week (7days) as below.

A: On-site training 4 members for each instrument.

B: Training at the country facility for 2 members for each instrument.

C: Training at the Principals place for 2 members of NMPA/ KSPCB for each Instrument.

Training should include but not limit to the following:

A: On-Site training

- a. Start-up shutdown procedure
- b. Principles of operation of the Equipment
- c. Basic measurement principle.
- d. Operation of the Equipment.
- e. Calibration method.
- f. QA/QC.
- g. Data management and software application
- h. "Do's" and "Don'ts" in operation of the Equipment
- i. Safety precautions.

B: Training at the country facility

- a. Basic maintenance procedure.
- b. Precautions in use of the Equipment.
- c. Inspection of the Equipment.
- d. Handling of hazardous chemicals and gas.
- e. Other, which are deemed to be necessary by the Identified bidder.

C: Training at the Principals place

- a. Detailed Maintenance Procedure.
- b. Trouble Shooting issues.
- c. Calibration
- d. Data processing
- e. Analytical Software utilisation
- f. Data transfer protocols QA/QC and data validation.

In case the Equipment for training the supplemental and/or supporting Equipment, the Identified bidder shall carry out the training including such Equipment.

The Identified bidder shall discuss and finalize the detailed content and schedule of the training program in consultation with the Board during installation of the Equipment.

The Identified bidder shall furnish the training manual and/or CD as required for all the Equipment supplied under the scope of work of this document.

The identified bidder shall include training cost at local and at principals place from Mangalore including lodging, boarding, peridium and travel cost at local or International travel.

Contents of training manual and/or CD for the Equipment are as follows:

1. Principle of the Equipment.
2. Operation and calibration of the Equipment.
3. Maintenance and basic repair of the Equipment.
4. Safety instruction of the Equipment.
5. Other, which are deemed to be necessary by the Identified bidder.

2. General GuideLines:

:

- a) The NMPA shall pay O&M charges to the Contractor at the end of each quarter after submission of validated data & air quality report by the Contractor, in accordance with the payment terms detailed in Special Conditions of Contract.
- b) NMPA shall pay all applicable Taxes, etc.
- c) The Owner/NMPA shall identify and hand over the site for erection & commissioning of Air Monitoring Stations free from all encumbrances.
- d) The Successful bidder shall make the arrangement for electricity, lease-line, Broadband/telephone connection at the site. The monthly charges for both electricity, Lease Line & Broadband/telephone bills shall be borne by the Contractor.
- e) The full O & M payment shall only be made if validated data is 90% or above and all the quarterly reports, calibration protocol maintenance scheduled and spare parts/ consumable replacement document are maintained and verified by the NMPA. The contractor has to maintain records / Receipts/bills paid available as and when required. The data capture rate should be as follows:

Data Display & supply frequencies and requirements

Description of Data Submission				
Data Display	Daily	Display on real time basis (15 min for all pollutants & meteorological data and hourly for PM)	90% or above daily data and AQI (between 6am to 6PM or as agreed upon time duration)	
Data Supply	Daily	Data hourly average values of 15 min for all pollutants & meteorological data and hourly for PM	90% or above daily data (between 6am to 6PM or as agreed upon time duration)	Submission of daily data after logical checks (through software) in the form of soft and hard copy
	Weekly	Report for all pollutants & meteorological data	90% or above weekly data	Submission of data on weekly basis (soft & hard copy)
	Monthly	Report for all pollutants & meteorological data	85% or above monthly data	Submission of data on monthly basis (soft & hard copy)
	Quarterly	Report for all pollutants & meteorological data	80% or above Quarterly data	Submission of data on Quarterly basis (soft & hard copy)
	Annually	Report for all pollutants & meteorological data	75% or above annual data	Submission of data on annual basis (soft & hard copy)
90% of data will be treated for 100% payment and less than that will be on pro-rata basis. No data will be accepted less than 75% and will be treated at nil data and the appropriate penalties shall be applied (refer Penalties clause)				

Bidder Responsibility:

1. Setting up of Central Data Server Center at respective Data Centers at NMPA / KSPBC & CPCB and Lease Line connectivity for data transmission.
2. Trained Manpower deployment at respective Data Centers.

3. Bidder will participate in the coordination meetings, training, etc.
4. Bidder will ensure quality data generation, regular calibration of Analyzers, online data validation, timely submission of software validated data.

The site for CAAQMS operation should be manned by the employees of the successful bidder at all reasonable office hours and at the time of requirement even for 24 hours. In addition the Successful bidder would arrange for a security of the site and equipment through appointment for security agency (providing at least one security guard) throughout the day.

2.1 Handing Over of Station: On expiry/closure/termination of the Contract Agreement, stations shall be handed over to NMPA in working condition to the satisfaction of NMPA. Few or all the spares procured by the Contractor and unused as on date of handing over may be purchased by the Owner at his discretion provided. Contractor is able to provide reasonability of the costs of such spares. In addition the Contractor shall provide consumables equivalent to three months consumption on expiry/closure/termination of the Contract Agreement without any extra financial implication.

2.2 Relocation of Station:

During contract period, if NMPA intends to shift CAAQM station from one location of the city to another location, due to some reason – functional or otherwise, Bidder shall shift the CAAQM station for which cost of shifting including dismantling, loading & transportation, reinstallation at new location and construction of foundation will be made by the NMPA/Board at a mutual agreed cost.

2.3 Penalties:

During O&M period, in case of any Analyses/ system failure, penalty will be charged by NMPA @ Rs.1,000/- (one thousand) per day per Analyzer after a grace period of seven (7) continuous non-working days. The grace period of seven (7) continuous non-working days shall be given only once per quarter (3 months).

For a failure of Data display:

NMPA/Board/panel, a penalty will be charged by NMPA @ Rs. 1,000/- (one thousand) per day after a grace period of five (5) continuous non-working days. The grace period of Five (5) continuous non-working days shall be given only once per quarter (3 months).

Failure due to power outage and other Force Major conditions shall not be considered

for levy of penalty.

Total penalty per year during O&M period on account of above conditions shall be **limited to 30% of total O&M charges** for one year. Failing which defective/ malfunctioning analyzer / system has to be replaced.

In case penalty in the year exceeds 30% of total yearly O&M charges, the Contractor shall be required to replace the defective analyzer (s) or systems with new ones at his own cost, failing which the NMPA shall have the right to terminate the O&M contract.

3.0 SCHEDULE

Contractor shall complete all activities covered in the scope of work up to installation & commissioning of Air Monitoring Stations within 180 days from date of Letter of Acceptance.

The Contractor shall carry out Operation & Maintenance of Air Monitoring Stations for a period of five (05) years from the date of commissioning of the station, which can be further extended at the mutually agreed rates and terms and conditions.

Annexure – II**O&M Scope of CAAQM Station**

The following scope/work/requirement given as under in addition to the work/scope/requirement defined in the Tender Document:

1. A separate Notification of Award shall be placed for O & M assignment by NMPA, before installation & commissioning of the equipment.
2. Reporting of data to the respective NMPA/ State Pollution Control Board / Pollution Control Committee and Central Pollution Control Board.
3. Successful bidder has to develop a **Mobile App** for showing the Air Quality Data and trend from all the CAAQM Stations in their scope.
4. Any balance of material not specified but required for the purpose must be supplied by the bidder.
5. Deployment of trained manpower on its regular rolls (employee PF/ESI/Claim can be checked during the contract period) for O&M of CAAQM stations in a Zone as under:-

Sl. No.	Responsibility	Minimum Persons	Minimum Qualification	Experience
1.	Operator	3 nos (1 person in each shift)	Graduate Engg./Diploma Engineer	5 years

Solar Radiation												
Rain Fall												

8.	Computers	Make/Model:	Status :
9.	UPS / ACs / Others	Make/Model:	Status :
10.	Data Display Board	Make/Model:	Status :
	Maintenance Requirement	Details/	1. 2.
	Specific Observation(s)		

Station Maintained By.....

Station supervised by

Attachment 2

DAILY REPORTING FORMAT FOR METEOROLOGICAL PARAMETERS

(To be submitted daily at 6 AM from the previous day 6 AM)

Location:

Date:

Hrs.	WIND SPEED	WIND DIRECTION	HUMIDITY	TEMPERATURE	SOLAR RADIATION	RAINFALL	REMARK S
06-07							
07-08							
08-09							
09-10							
10-11							
11-12							
12-13							
13-14							
14-15							
15-16							
16-17							
17-18							
18-19							
19-20							
20-21							
21-22							
22-23							
23-24							
00-01							
01-02							
02-03							
03-04							
04-05							
05-06							
Min.							
Max.							
Average							

9 SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract shall supplement the General Conditions of Contract. Whenever there is a conflict, the provisions herein shall prevail over those in the General Conditions of Contract the corresponding clause number of the GCC is indicated in parentheses, if applicable.

1.0 CLIMATE CONDITION

Precaution and protection against the specific climate conditions in India such as heavy rain, high temperature, high humidity, gales, excessive sunshine, flooding or any other climate conditions which could cause damage upon the Equipment or otherwise interfere with the execution of the works shall be taken. The Equipment to be supplied shall be tropicalized.

2.0 CONSUMABLES AND SPARE PARTS

Supply of Consumables and Spare Parts

The Contractor shall provide the consumables and spare parts as per requirement of Operation & maintenance of CAAQMS Stations throughout the entire period of contract **for five years free of cost.**

2.1 After Sales Services

The Contractor shall guarantee the availability of all consumables, spare parts, maintenance and repair work for each Equipment at cost basis for at least ten (10) years after the O&M period of 5 years as specified in the Specifications.

Bidder should submit certificates from the manufacturers in support of available service centers and availability of spare parts and consumable in India.

3.0 NAME PLATE

The Contractor shall affix the name plate with the following description in English on all the Equipment:

- 1) Name of the station
- 2) Name of the Equipment
- 3) Manufacturing date
- 4) Production serial number
- 5) Equipment model number
- 6) Name of manufacturer
- 7) Ratings of the Equipment
- 8) Logo of NMPA .

4.0 MARKING

The Contractor shall mark the following information in the sequence described below and in a frame commensurate with the size of packing and/or the Equipment.

- 1) Consignee:(Name of the NMPA & Address), India
- 2) Name of the Works. Supply and O&M of Continuous Ambient Air Quality Monitoring Stations (CAAQMS) for NMPA at -----
- 3) Name of the Project: Supply and O&M of Continuous Ambient Air Quality Monitoring Station (CAAQMS) for NMPA/KSPCB at-----
- 4) Contract number:
- 5) Contractors name:
- 6) Port or airport of discharge:
- 7) Country of origin:
- 8) Item, and if applicable, package number in sequence, and quantity per package

and/or Equipment:

- 9) Description of Equipment:
- 10) Net and gross weight and cubic measurement:
- 11) Shipper's name and/or marks:
- 12) Caution marks, if applicable:
- 13) Other markings required by the Board:

5.0 SHIPMENT

The Contractor shall be responsible for the delivery of the Equipment to Site designated by the NMPA and for the coverage of shipping charges, freight, insurance premiums up to handling over the Equipment at Sites, inland transportation and temporary storage.

5.1 Notification and Submission of Documents

Upon shipment, the Contractor shall notify the NMPA and the Insurance Company by email of the following details of the shipment.

- 1) Contract number
- 2) Description and quantity of the Equipment
- 3) Name of vessel and cargo
- 4) Number and date of bill of lading and airway bill
- 5) Date of shipment, port of discharge, expected date of departure and expected date of arrival
- 6) Invoice amount of shipment
- 7) Name of a claim settling agency in India.

5.2 The Contractor shall email the following documents to the NMPA, with a copy to the Insurance Company.

(1) Equipment of Foreign Origin: (Not Applicable)

Partial shipment and transshipment is allowed.

(2) Equipment to be Supplied from within India:

Upon delivery of the Equipment to the transporters, the Suppliers shall notify the Board (NMPA) and mail the following documents to the NMPA.

- i) Four copies of the Supplier's invoice showing the Equipment's description, quantity, unit price and total amount
- ii) Acknowledgement of receipts of goods from the consignee i.e. receipted delivery note, railway receipt (RR), or truck receipt (LR)
- iii) Supplier's and/or Manufacturer's warranty certificate
- iv) Factory test & inspection certificate and Material Dispatch Clearance Certificate (MDCC) issued by the NMPA.
- v) Insurance certificate
- vi) Certificate of country of origin

The above documents shall be received by the Board before arrival of the Equipment and, if not received, the Supplier shall be responsible for any consequent expenses.

6.0 WORKS SCHEDULE (as per scope of work)

7.0 WARRANTY / O & M CONTRACT

Operation & maintenance of Air Monitoring Station:

The identified bidder's responsibilities shall include without limitation the following works to be carried out in the Air Monitoring Station installed under this Contract during the Operation & Maintenance of the station:

- a) Operation and Maintenance of all the commissioned equipment's and aments as supplied by the Manufacturer under the Contract including services during forced and planned outages and overhauls.
- b) The identified bidder shall offer O&M for installed equipment.
- c) The identified bidder shall provide to the NMPA/KSPCB/CPCB a monthly summary of all operation and maintenance activities performed by the identified bidder during each month.

- d) **Operation and Maintenance Obligation:**
In implementing its obligations to operate and maintain the facility under this Contract, the identified bidder shall:
- i) Undertaking comprehensive maintenance including i.e. schedule and breakdown maintenance & repair at site and keep NMPA/ KSPCB Informed regarding status of equipment's and forward daily data.
 - ii) Obtain permission from the NMPA/KSPCB/CPCB and inform the O&M for any assistance for which equipment is required to be sent to the works. Identified bidder shall arrange substitute equipment to keep CAAQM station operational.
 - iii) Take reasonable action to assure that Personnel deployed at Air Monitoring Station and any sub Identified bidder and agents are provided with a work place in compliance with applicable Law.
 - iv) Keep the Air Monitoring Station clean, well maintained and in good working condition.
 - v) Security: It is the duty of the Identified bidder to secure the movable, immovable and other properties of the NMPA at the Air Monitoring Station. The Identified bidder shall indemnify the loss caused to the NMPA on account of any damage, loss or theft caused to the property of the NMPA.
 - vi) Scheduled Maintenance: Unless NMPA/KSPCB and Identified bidder mutually agree otherwise, perform all required Scheduled maintenance for all equipment, auxiliaries etc., in accordance with the O&M specifications.
 - vii) Unscheduled Maintenance: Perform all Unscheduled Maintenance and repair for all equipment, auxiliaries etc. within (24) hours of the occurrence of the event requiring Unscheduled Maintenance, the operator shall provide the NMPA/ KSPCB with detailed written information on nature of the repair or replacement to be carried out, estimated down time and other necessary details as required.
 - viii) The Identified bidder shall source all the spares required for maintenance & repairs of the installed equipment from O&M only.

The Operator shall not:

- e) Make any modifications as to the Air Monitoring Station, other than in an Emergency, without the prior written approval of the NMPA
- f) Dispose of any assets, settle law-suits or engage in transaction relating thereto on the NMPA/KSPCB's behalf without the prior written approval of the NMPA
- g) The Identified bidder shall purchase spare parts, materials, supplies and other consumable items, and maintain in inventory thereof, for the Air Monitoring Stations. All such material supplied and other items shall be the property of the Identified bidder. However all the spares shall be sourced from OEM's only.
- h) The Identified bidder shall review all applicable Laws and initiate and maintain such prosecution, procedures and operating plans relating to operation of the Air Monitoring Station as are necessary to comply therewith or assist the NMPA/ KSPCB in complying therewith as the case may be.
- i) The Identified bidder shall operate the equipment as per the laid out standards in the operating manual of the equipment and providing data for ambient ait to NMPA/ KSPCB/ CPCB on daily basis in the suggested format.
- j) The CAAQMS has to be in operation for a minimum of 90% of the days in a year, 24 hours a day, and should not be inoperable for more than 7 days at a stretch.
- k) Provide data collected through operation of the equipment on daily basic in suggested output formats given in the bid document.
- l) Establish and maintain a daily and monthly reporting system to provide storage and ready retrieval of operation and, maintenance data including such information necessary to verify calculations. The monthly reporting shall contain variances from targets.
- m) Provide access to the NMPA/KSPCB/CPCB to the Air Monitoring Station and its data at all reasonable times and as and when required.
- n) Provide the operational data required to all competent authorities including,
- o) On line transfer of data NMPA/KSPCB/CPCB web site.
- p) The Identified bidder shall ensure accuracy of the data provided as per standards.

- q) The Identified bidder shall ensure periodic re-calibration of all the equipment as per manufacturer's instruction and maintain "Protocol Manual Calibration" as per USEPA calibration protocol. The same has to be documented for ready verification in the below format.

7.1 Period of O&M Contract

The complete CAAQMS shall be under Operation & Maintenance Contract from the date of commissioning of the station and maintenance of all the equipment including supply of all material shall be the responsibility of the Contractor during the validity of Operation & Maintenance Contract. The Contractor shall, in addition, comply with the performance guarantees if specified under the Contract. If, for reasons attributable to the Contractor, these guarantees are not attained in whole or in part, the Contractor shall make such changes, modifications, and/or additions to the Equipment or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own costs and expenses and to carry out further performance test.

8.0 INSURANCE

- A) The **insurance (Comprehensive) shall be in an amount of equal to One Hundred Ten (110) percent** of the value of the Equipment upto handing over of the Equipment to NMPA on "All Risks" basis, including war risks and strikes, naming the NMPA as the beneficiary.
- B) The Contractor shall take the comprehensive all risk insurance cover for the complete station during O&M period including statutory insurance of Contractor's personnel. The value shall be 110% of the total value of the stations depreciated annually as per standard norms.

9.0 INSTALLATION

Bidder shall depute Engineer / supervisor for on-site assembly, installation, commissioning and startup of the supplied equipment. Bidder shall also furnish tools required for assembly, commissioning and maintenance of equipment during O&M period (five years).

All the necessary arrangements and adjustments for suitable installation and operation of the equipment shall be made by the Bidder including power supply and telephone / mobile/ internet connection.

10.0 INSPECTION AND TEST

10.1 Unpacking Inspection

Unpacking inspection shall be performed by the Contractor in the presence of NMPA nominee (representative) shall inspect whether all the items and quantity of the Equipment have been packed, delivered in conformity with the Equipment and packing

list without any damage during the shipment, immediately after arrival of the Equipment at the Location..

The Contractor shall submit the unpacking inspection report to the NMPA.

10.2 Site Inspection

The Contractor shall carry out site inspection of the Equipment at each Site at the completion of installation works to confirm that the installation works and the function of the Equipment is satisfactory for the requirements specified in S/W and the Specifications.

The Contractor shall carry out the functional test to ensure that the consumables and spare parts are good for the operation, maintenance and replacement in future.

As a result of site inspection, the Equipment regarded as unsatisfactory or unacceptable by the NMPA shall be promptly remedied by the contractor. The Contractor shall submit the site inspection report to the NMPA and the Consultant.

10.3 Performance Test

The Contractor shall carry out the performance test to inspect and witness the function of each of the equipment supplied under the awarded package at site.

Performance test shall be carried out in accordance with scope of work for all the Equipment supplied.

In case the Equipment for performance test requires the supplemental and/ or supporting Equipment, the Contractor shall carry out the performance test including such Equipment.

Performance test will be considered to be complete only after successful completion of performance test of each equipment pertaining to respective packages and certifying the same by a third party (Experts). A third-party inspection to be carried out after installation by an authorized or expert, the cost shall be borne by L1 successful bidder.

In case of results of such performance test found to be unsatisfactory by the NMPA, same shall be promptly reminded by the Contractor.

The Contractor shall prepare the performance test procedures for approval by the NMPA at least thirty (30) days prior to the testing schedules.

The Contractor submits the performance test report to the NMPA.

11.0 COMPLETION

The Contractor shall complete all the Works up to installation and commissioning of CAAQMS's within 180 days after the date of commencement of Letter of Acceptance (**LOA**).

12.0 SUBMISSION OF DOCUMENTS

12.1 Work Program

Within fourteen (14) days from the notification of award of the Contract, the Contractor shall submit the detailed Works program and schedule to the NMPA indicating the following items:

- a. Equipment supply program and Equipment layout plan(if applicable)
- b. Design drawings and utility list, if required
- c. Subcontractor list for installation work of the Equipment if not already specified in the Techno-commercial Bid
- d. Program for factory, pre-shipment, unpacking and site inspections and performance test
- e. Installation program including personnel organization chart of the Contractor.

The Contractor shall be responsible for any discrepancies, errors or omissions or delay in delivery and submission of the work program, and any expenses resulting there from shall be borne by the Contractor/**Successful L1 bidder**.

12.2 Other Documents

The Contractor shall submit the following documents within forty five (45) days after the notification of award.

Item	Number of Documents to be sent to CPCB / concerned NMPA/KSPCB
Catalogues, product data and test reports	4
Installation manuals	4
List of consumables and spare parts	4
Manufacture's specifications	4
Training program	4

Besides the documents here above, the Contractor shall submit the following documents at the designated time for submissions as follows:

Item	Number of Document	Time of Submission
	NMPA	
Inspection report	2	At the time of completion of factory, pre-shipment unpacking and site inspections (if applicable)
Training manual	10	At the time of commencement of installation of Equipment
Operation and Maintenance manual	10	At the time of Commencement of installation of Equipment
Training program	1	By the time of completion of installation of Equipment
Report of performance test	1	At the time completion of performance test
Video (Optional) CD	1	By the time commencement of training
List of Equipment supplied	2	At the time of completion of the Work

Besides the documents here above, the Contractor shall submit the notices, reports, and other documents when deemed necessary, in accordance with the direction of the Board.

13.0 PAYMENT

13.1 Method of Payment

The payment shall be made in the currency specified in the contract. The L1 successful

bidder make arrangement for the payment to the supplier.

13.2 Terms and Conditions of Payment

Bids with terms and conditions of payment other than that specified below shall be rejected.

(a) Payment for goods and services (excluding O&M charges) supplied from abroad: **Not applicable.**

Payment for goods supplied from abroad, letter of credit will be opened for 100 % value with condition to release the payment as follows:

On shipment: Eighty (80) percent of the contract price of the Goods shipped shall be paid through irrevocable Letter of Credit established/opened in favour of the foreign supplier in a scheduled commercial bank in India or a bank in supplier's country acceptable to the purchaser and upon submission of the documents specified in sub-clause 5.2 (1) of SCC including : (i) Packing list and (ii) Supplier's certificate that the amounts shown in the invoice are correct in terms of the contract and that all the terms and conditions of the contract have been complied with and

On Final Acceptance: Balance Twenty (20) percent of contract price of the equipment shall be paid within 30 days of receipt of goods and on submission of claim supported by the acceptance certificate issued by the purchaser and the submission of Performance Bank Guarantee equal to 10% of the contract value is to be submitted.

(b) Payment of goods and services (excluding O&M charges) supplied from India.

On satisfactory installation and commissioning including training (to be certified by the purchaser) and submission of acceptance certificate (Certificate of Country Origin), full payment will be made, subject to recovery of retention money as per clause No 52 of Vol.-I.

Operation of Letter of Credit (Not Applicable)

- i. If requested specifically by the supplier, the Letter of Credit will be confirmed, but the cost/charges shall be borne by the supplier.
- ii. If Letter of Credit is required to be extended/reinstated for reason not attributable to purchaser, the charges thereof shall be charged to the supplier account.
- iii. The bank charges in India will be borne by the purchaser.

(c) **Payment of Operation and Maintenance charges:**

O&M cost of each year shall be paid after end of every quarter in equal installments based on submission of required air quality report as per annexure X1 to X5 along with data obtained from calibration documentation. Any penalties applicable if any as referred in Scope of Work for O&M Contract and as per notification of award of contract shall be deducted from the quarterly payment. Payment of O & M bill quarterly subject to recovery of retention money as per clause No 52 of Vol.-I.

SI No	Description	Quantity	Percentage
1	During operation & Maintenance period of 5 years (60 months) of the CAAQMS station.	LS	1 /60 of the item No 1.2 of BoQ plus tender percentage x 3 months (quarterly payment)

14.0 PRICES

The prices quoted **shall be firm** throughout the tenure of the Contract. Any increased cost incidental to the performance of the Works due to any economic dislocation either in the origin country or India or to any other causes such as currency restriction, price hike of the Equipment, wage hike for labour or revaluation of the currency cannot be claimed by the Contractor to the NMPA.

15.0 PERFORMANCE SECURITY (Ref. GCC CLAUSE 34 instruction tenderers of vol.- I).

16. LIQUIDATED DAMAGES (Ref. GCC CLAUSE 49 No of Vol - I)

Annexure – X1

MONTHLY FIELD CHECK LIST OF (To be filled by NMPA officials deputed)
CAAQM STATION UNDER OPERATION CONTRACT ----- NMPA,
Panambur

S. No.	Description	------(name of the Station)	Remarks
1.	Station Visit Date (i) 1 st Week (ii) 2 nd Week (iii) 3 rd Week (iv) 4 th Week		
2.	SOP Available at Station		
3.	Environmental Condition of Station		
4.	Protocol of Station available		
5.	Availability of Calibration Gas		
6.	Availability of Permeation Tube (NIST Traceable)		
7.	Bi Weekly Calibration Done (Precision check, twopoint calibration check)		
8.	Full Calibration Done (Multipoint Calibration check)		

9.	Insurance Validity		
10.	Electricity Bill Paid, if any		
11.	Telephone Bill Paid, if any		
12.	Security Guard Payment, if any		
13.	Servicing of ACs Installed, if any		
14.	Data Display Board Working		
15.	O&M Rate - Cheque payment, if any		
16.	Name of the Company Engineer Deputed/Present		
17.	Data Analyst at Central Station Deputed/Present		
18.	Log-Book maintained and observation entered.		
19.	Date Received (Daily / Monthly)		
20.	Name of the visiting Official of SPCB		
21.	Special Remarks, if any		

.....
 Signature of the
 official

Annexure -X2 TO X5 Reporting Formats

New Mangalore Port Authority

Continuous Ambient Air Quality Monitoring Report(MAIN POLLUTANTS)

To be submitted daily at 06 morning for that day ending at next 06 morning

Daily Report

Station Name:-----

Month:-----

Report No. :

Date:----- --.

Monitoring Location :

Data Interval: 1 Hr. Average Monitoring Conducted

By:-----

Hrs.	NO	NO2	NOX	NH3	SO2	CO	O3	PM2.5	PM10	Benzene	Toluene	Ethyl Ben	MP Xylene	O xylene
	µg/m ³	µg/m ³	ppb	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
19-20 Hr.														
20-21 Hr.														
21-22 Hr.														
22-23 Hr.														
23-00 Hr.														
00-01 Hr.														
01-02Hr.														
02-03 Hr.														
03-04Hr.														
04-05 Hr.														
05-06 Hr.														
MINIMUM														
MAXIMUM														
AVERAGE														
Data Captured														

Note :														

Annexure -X3 TO X5 Reporting Formats

New Mangalore Port Authority

continuous Ambient Air Quality Monitoring Report (Mean Concentration of Main Pollutants)

Year

Monitoring Location:

Months	NO	NO2	NOX	NH3	SO2	CO	O3	PM2.5	PM10	Benzene	Toluene	Ethyl Ben	MP Xylene	O xylene
	µg/m ³	µg/m ³	ppb	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³	µg/m ³
January														
February														
March														
April														
May														
June														
July														
August														
September														
October														
November														
December														

MINIMUM														
MAXIMUM														
AVERAGE														

Calculation of Payment for O & M Charges on Quarterly Basis for CAAQM Stations under O & M Contract

Name of the Station <input type="checkbox"/>		STATION I (Location	
Quarter No.: <input type="checkbox"/>			
Duration: <input type="checkbox"/>			
Year: <input type="checkbox"/>			
Percentage of valid monthly data captured rate <input type="checkbox"/>	Month 1		
	Month 2		
	Month 3		
Average Quarterly Data Captured Rate <input type="checkbox"/>			
		Price for service portion	Price for material part & other incidental charges
		70%	30%
Base Amount per Quarter (as per NoA)(A)			
Proportionate Amount based on Valid Data Captured Rate(B) Formula: see at footnote* (Specimen Calculation sheet attached in Annexure I)			
Applicable Deduction as per penalty provision for continuous non-functioning(C) (Specimen Calculation sheet attached in Annexure II)			

Any Other Deduction, specify with justification(D)		
Applicable Taxes (GST) (E)		
Net Amount Payable () [F = B- (C+D) +E]		
Total O&M cost Payable(Station Wise)	(i)	

* Percentage quarterly data captured rate/ 90% X A (considering 90% validated data eligible for 100% payment)

Annexure I(Ref.:Invoice no---dated--for the period)

Name of Station*	Name of non-functional system	Total period of continuous non-functioning (days)	Period considered for penalty calculation after grace period**	Penalty amount (period x unit rate)

Total Penalty Amount (>):

* **(To be prepared & submitted separately for each station)**

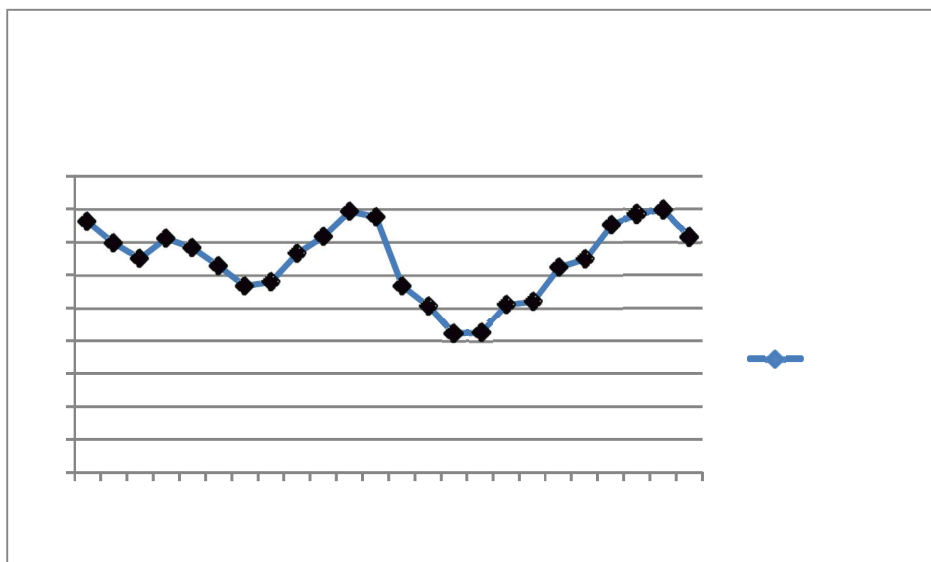
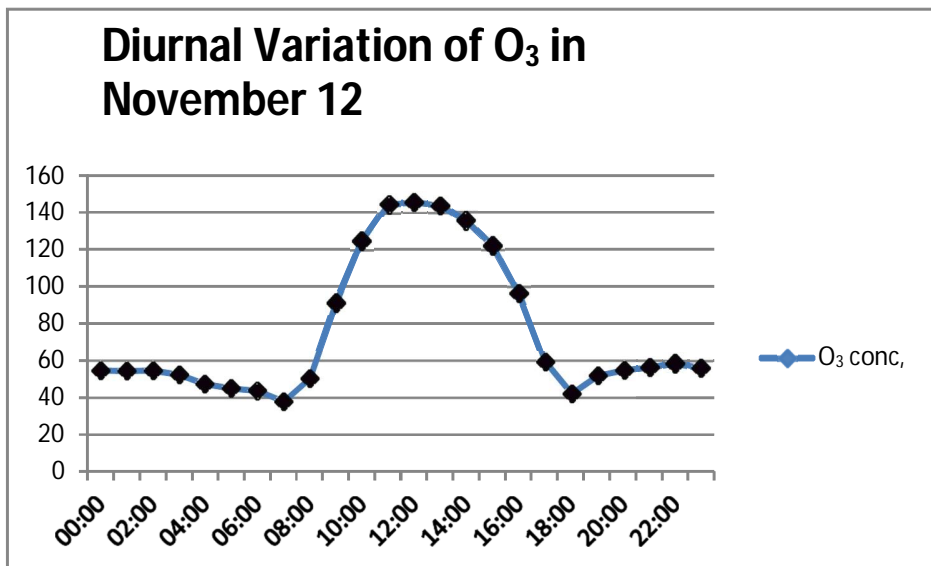
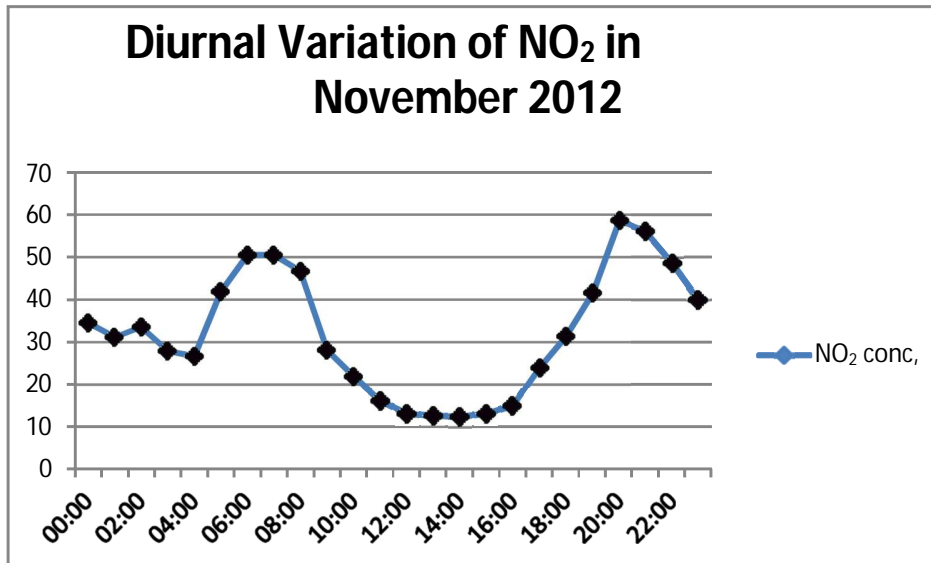
** **Grace period of 7 days is applicable only once per quarter**

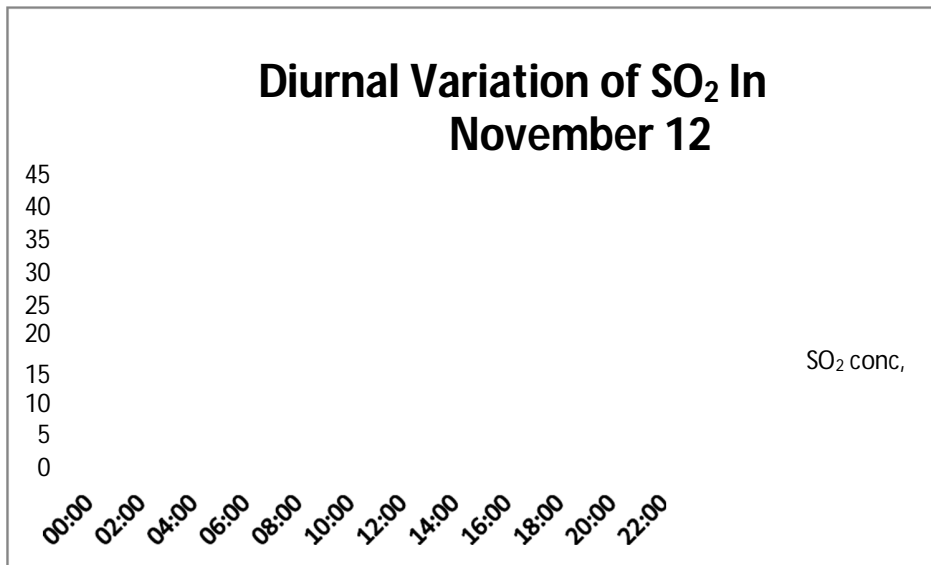
Annexure II

(Ref.: Invoice no-----dated-----for the period-----)

Name of Station*	Observed Monthly Data Captured Rate														Average Percentage Data Capture Rate
	For gases pollutant						Dust Particles		For Mat. Parameters						
	NO2	O3	SO2	CO	NH3	BTX	PM2.5	PM10	Temp.	RH	WS	WD	SR	RF	

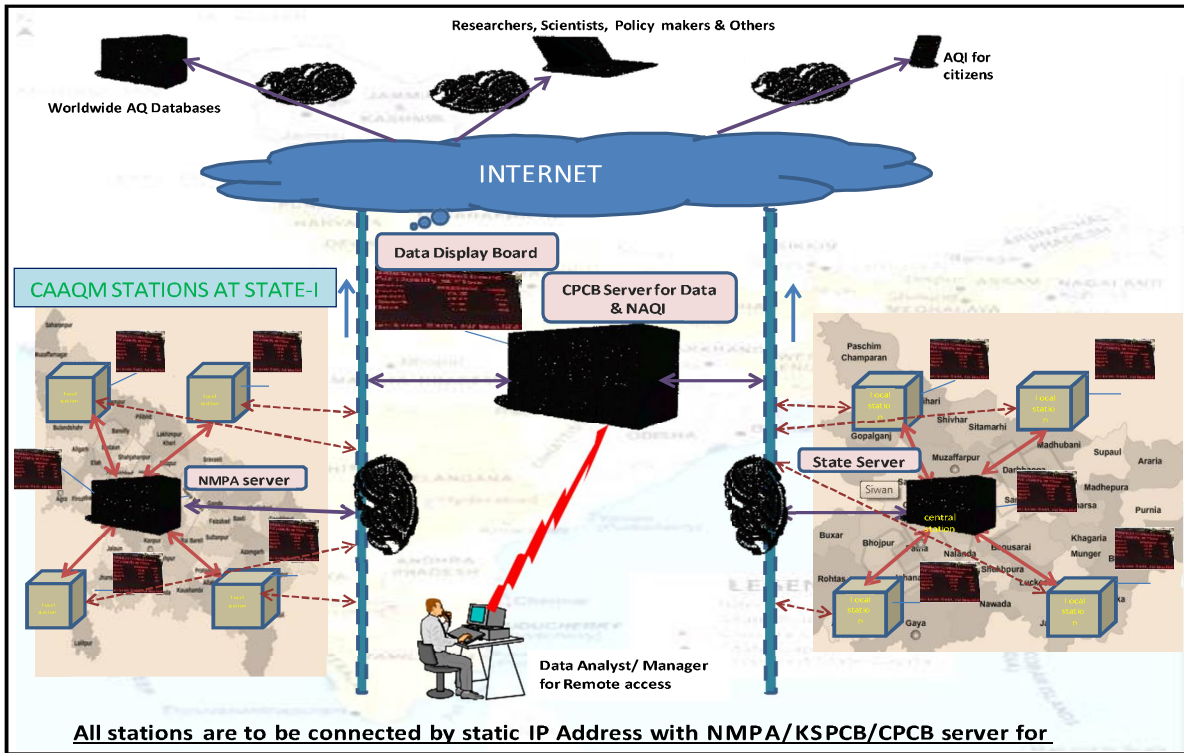
* (To be prepared & submitted separately for each station)





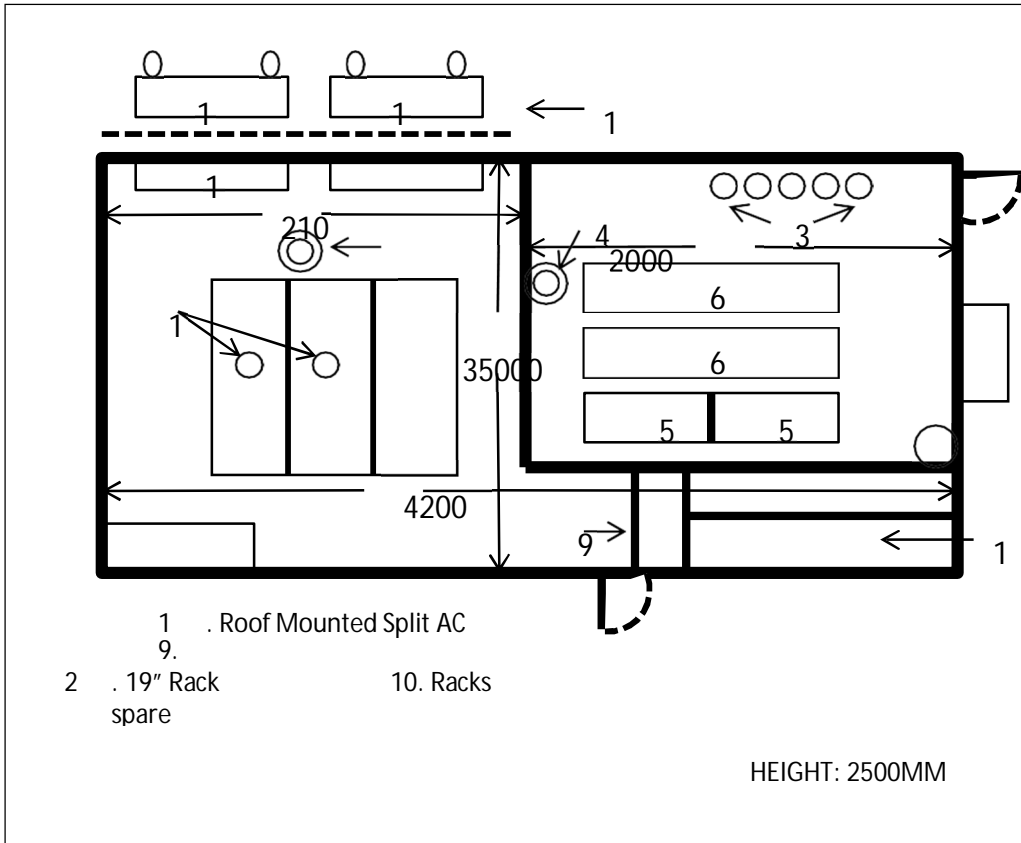
Similarly seasonal variations and yearly graphs with Annual Report to be submitted by the successful bidder

CAAQM STATIONS AT STATE-II

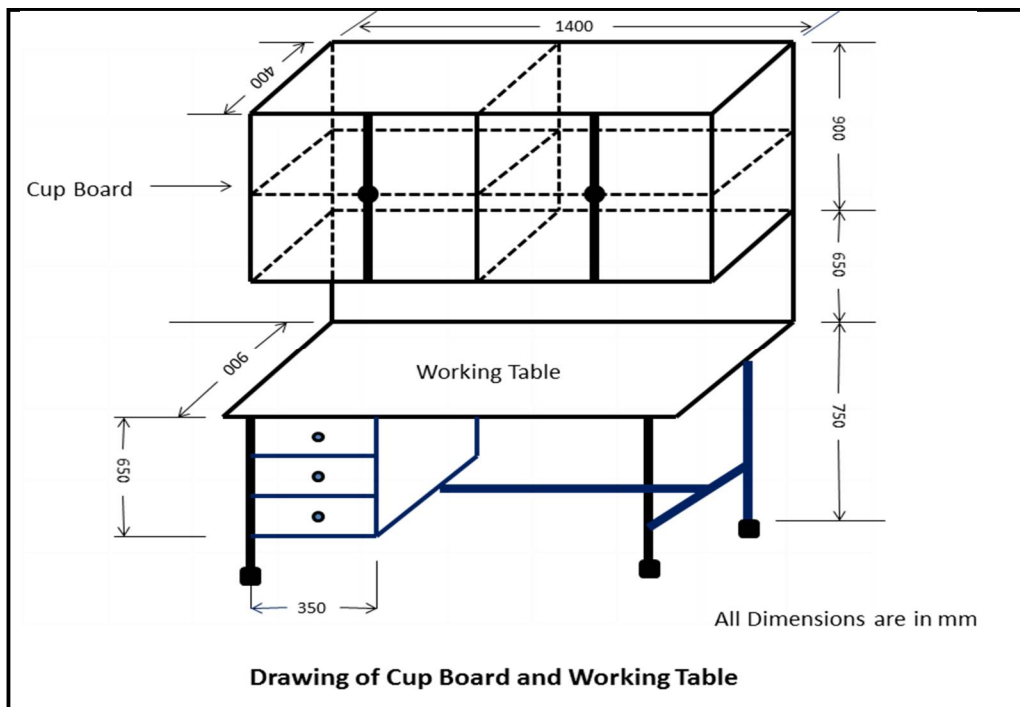


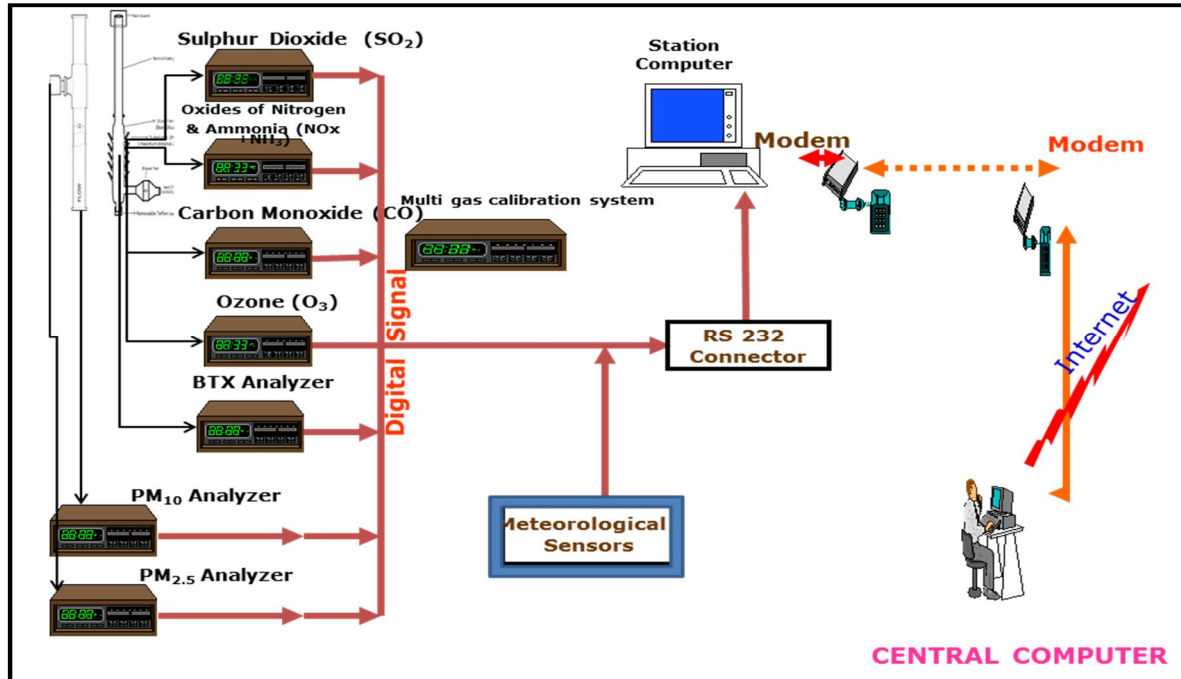
ANNEXURE

(A) Drawing of a CAAQM Station



Drawing of Continuous Ambient Air Quality Monitoring Station



(B) Architecture of CAAQM System**(C) Protocol for Data Transmission from CAAQM Stations**

Presently KSPCB/CPCB is operating NAQI network which uses this protocol mentioned below for the data collection at central server to generate NAQI which is made available to the public. The Instrument Supplier will have to generate the data output immediately after installing the CAAQMS at any location in this format so that station gets integrated into the existing system immediately.

However, the proposed procedure given in this document of data management through ISO 7168 format would be applied after proper system checks and setup. In parallel both systems will be operated for nearly six months and finally, ISO based system will be adopted for future data management from CAAQMS in the entire country.

1. Data Format

- Data file on real time basis having 15 minutes average values in a prescribed format attached at Annexure-I should be generated at the station for which Instrument Supplier is responsible.
- File should be updated after every 15 minutes.

- Data intervals like 00:15, 00:30, 00:45, 01:00 should be fixed at the station.
- Station file name should be exactly as the name of the station to be displayed on the web portal. i.e. Panambur, Mangalore. Here precaution is to be taken that no space between words should be given or no special characters should be used.
- File should be recorded in a folder c: \data \sanathnagardata.txt
- File should allow data appending sequentially.
- Date of last file record appended in the file should be recorded and data afterwards be placed in the data file.
- File appending should continue subject to max 97 lines. First in First out mechanism shall be followed in keeping file size to 97 lines.
- Hence, in the specified folder c:\Data\ there will be a single file which will keep appending as per format attached.
- Duplicate entry of any data should not be made in the file.
- System should have capability to create previous record data file for which user will give the date. This is required to have lost data makeup in the final database, if any.

2. Data Mapping

- Protocol for each parameter is fixed as below:

1. 15 Minutes average value will be provided by the operator of the CAAQMS
2. Each SPCB will have the parameter as mentioned in the table only. Not even a small gap or space is provided other than the mentioned table is acceptable.

3. Standard Parameter Naming Protocol and Conversion factors Table

Parameters Name	Parameter Abbreviations	Unit	Conversion factors at 25°C
Rack Temperature	Temp	°C	
Carbon Monoxide	CO	mg/m ³	1 ppm=1.145mg/m ³
Sulphur Dioxide	SO ₂	µg /m ³	1 ppb=2.62 µg/m ³
Nitric Oxide	NO	µg /m ³	1 ppb=1.23 µg/m ³
Nitrogen dioxide	NO ₂	µg /m ³	1 ppb=1.88 µg/m ³
Oxides of Nitrogen	NO _x	Ppb	--
Ozone	Ozone	µg /m ³	1 ppb=1.96 µg/m ³
Particulate Matter less than	PM ₁₀	µg /m ³	--

10 Micron size			
Wind Speed	WS	m/s	--
Wind Direction	WD	Deg	--
Ambient Temperature	AT	°C	--
Relative Humidity	RH	%	--
Barometric Pressure	BP	mmHg	--
Solar Radiation	SR	W/mt2	--
Rain Fall	RF	Mm	--
Vertical Wind Speed	VWS	Degree	--
Particulate Matter less than 2.5 micron size	PM2.5	µg /m3	--
Benzene	Benzene	µg /m3	1ppb=3.19 µg/m3
Toluene	Toluene	µg /m3	1ppb=3.77 µg/m3
Xylene	Xylene	µg /m3	1ppb=4.34 µg/m3
Ethyl Benzene	Eth-Benzene		1ppb=4.34 µg/m3
M+P_Xylene	MP-Xylene		1ppb=4.34 µg/m3
Methane	CH4	µg /m3	1ppb=0.65 µg/m3
Ammonia	NH3	µg /m3	1ppb=0.70 µg/m3
Formaldehyde	HCHO	µg /m3	1ppb=1.23 µg/m3
Mercury	Hg	µg/m3	1ppb=8.20 µg/m3

Note: 1. Any other parameter can be added with the prior approval of ITDivision ONLY.

4. Internet Connectivity

- Internet connectivity should be available on 24X7 basis for data transmission with an uptime of 99.9%. For this purpose, every CAAQM station should have two kinds of connection:
 - i) Leased Line Circuit of at least 01 Mbps capacity
 - ii) Broad Band connectivity through telephone line. Both facilities should be configured in ready to use condition. If possible, auto failover should be created.

Note: Connectivity through Data card is not acceptable except in any special circumstances, where both of these types of connectivity's are not available. For such case NMPA engineer in charge of Division shall be consulted before taking a final decision.

5. Other Information:

1. Area Map showing station location
2. Latitude, Longitude and altitude of the station
3. Photo of station along with nearby areas
4. One page write-up about the station activities in the vicinity of station including major pollution sources like nearby road, rail, restaurants, generator sets, etc.

Annexure — I

File Name: Panambur

1,2,3,4,5,6,7,8,Station name, Parameter, Date from, Date to, Value, calibration flag, main tflag, Remark,

Panambur,CO,27-04-2015 13:00,27-04-2015 13:15,0.2497,0,0, analyser faulty,
 Panambur,C0,27-04-2015 13:15,27-04-2015 13:30,0.2470,0,0,analyser faulty,
 Panambur ,C0,27-04-2015 13:30,27-04-2015 13:45,0.2470,0,0,analyser faulty,
 Panambur,C0,27-04-2015 13:45,27-04-2015 14:00,0.2470,0,0,analyser faulty,
 Panambur,Ozone,27-04-201513:00,27-04-201513:15,59.6710,0,0, flowproblem,
 Panambur,Ozone,27-04-2015 13:15,27-04-201513:30,59.5960,0,0, analyser
 faulty,
 Panambur ,Ozone,27-04-201513:30,27-04-201513:45,59.5960,0,0, analyser
 faulty,
 Panambur,Ozone,27-04-2015,13:45,27-04-2015,14:00,59.5960,0,0,
 analyserfaulty,
 Panambur ar,N0,27-04-2015 13:00,27-04-2015 13:15,0.5922,0,0,
 analyserfaulty,
 Panambur ,N0,27-04-2015 13:15,27-04-2015 13:30,0.4435,0,0,0,
 Panambur,N0,27-04-2015 13:30,27-04-2015 13:45,0.4435,0,0,0,
 Panambur ,N0,27-04-2015 13:45,27-04-2015 14:00,0.4435,0,0,0,
 Panambur,So2,27-04-2015 13:00,27-04-2015 13:15,3.5233,0,0,0,
 Panambur ,So2,27-04-2015 13:15,27-04-2015 13:30,3.7278,0,0,0,
 Panambur,So2,27-04-2015 13:30,27-04-2015 13:45,3.5233,0,0,0,
 Panambur,So2,27-04-2015 13:45,27-04-2015 14:00,3.7278,0,0,0,
 Panambur,RT,27-04-2015 13:15,27-04-2015 13:30,33.2260,0,0,0,
 Panambur,RT,27-04-2015 13:30,27-04-2015 13:45,33.2240,0,0,0,
 Panambur,AT,27-04-2015 13:45,27-04-2015 14:00,33.0960,0,0,0,
 Panambur,AT,27-04-2015 14:15,27-04-2015 14:30,33.3740,0,0,0,
 Panambur,RH,27-04-2015 13:15,27-04-2015 13:30,41.3080,0,0,0,
 Panambur,PM10,27-04-2015,13:15,27-04-2015
 13:30,30.3000,0,1,analyserfaulty,
 Panambur,PM10,27-04-2015 13:30,27-04-2015 13:45,30.3000,1,0,analyser

 faulty,

Please note:

Here 0-zero stand for normal operation of instruments in **calibration flag status**

1-Stands for calibration mode ON and data will not be considered for averaging purpose. Same is true for Maintenance mode where 0-normal and 1 maintenance mode ON.



NEW MANGALORE PORT AUTHORITY
Panambur, Mangalore

**SUPPLY, INSTALLATION, COMMISSIONING OPERATION AND
MAINTENANCE SERVICES OF CONTINUOUS AMBIENT AIR
QUALITY MONITORING (CAAQM) STATIONS AT NEW MANGALORE
PORT FOR A PERIOD OF 5 YEARS**

TENDER DOCUMENT

Volume – III

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SECTION VI**(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 works and cost thereof.
- 1.1.5 The Tenderer will be held to have familiarized 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 all taxes if any excluding GST and every kind of temporary work executed or used in connection 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 tendering. They are not to be taken as a guarantee that the quantities scheduled will 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 provided 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 purposes 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 Conditions 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) All taxes if any excluding GST on the transfer of property in goods in the execution of works, Excise Duty, Duties, etc. (other than 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 environmental aspects 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, centimeter or millimeter 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.

Abbreviations

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 :	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 /	square metre

sqm t	
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
Qtl	Quintal

BILL OF QUANTITIES

Name of work: Supply, Installation, Commissioning, Operation and Maintenance of Continuous Ambient Air Quality Monitoring (CAAQM) Stations at NMPA for a period of 05 years.

Item No	Description of items	Probable quantity	Unit	Rate (in figures and in words)	Amount Rs. Ps.
1.1	Supply installation and commissioning and testing of continuous online ambient air quality monitoring (CAAQM) stations at 1 (One) identified areas at New Mangalore Port for five years as per the schedule of requirements and as per the CPCB technical specifications/Green Port Policy Guidelines/NAAQMS/Any other statutory requirements, including Labour/ staff/ equipment, material/spares, insurance, training to the NMPA staff, duly considering all spares and consumables, manpower, security, Electricity & Telephone charges, but excluding taxes etc complete as directed by Engineer-in-charge- Supply of equipment and installation as per the requirement mentioned in CPCB guidelines.	1	L S	1,68,18,000.00	1,68,18,000.00

1.2	Supply installation and commissioning and testing of continuous online ambient air quality monitoring (CAAQM) stations at 1 (One) identified areas at New Mangalore Port for five years as per the schedule of requirements and as per the CPCB technical specifications/Green Port Policy Guidelines/NAAQMS/Any other statutory requirements, including Labour/ staff/ equipment, material/spares, insurance, training to the NMPA staff, duly considering all spares and consumables, manpower, security, Electricity & Telephone charges, but excluding taxes etc complete as directed by Engineer-in-charge- Operation and maintenance of CAAQM stations at one location for 05 years (60 months) duly considering all spares and consumables, manpower, security, electricity and telephone charges	1	L.S	2,44,47,750.00	2,44,47,750.00
	TOTAL AMOUNT Rs.				4,12,65,750.00
	Excess / Less (in percentage in two decimals)				
	Quoted amount in Figures				

(Quoted amount in Words Rupees)

Note: GST as applicable shall be claimed as separate line item in tax invoice and the same will be paid separately.

1. Contractor shall file the applicable returns with tax department in time and submit the same as documentary evidence.
2. The quoted amount would include arranging of designs of columns/beams/any required drawings by the Contractor during course of execution by reputed consultant and vet by reputed Institution.

SIGNATURE OF THE BIDDER

(iii) FORM OF TENDER

NAME OF CONTRACT.....

To

Executive Engineer (Civil)
New Mangalore Port Authority
Panambur, Mangalore - 575 010

Sir,

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 whole of the Works comprised in the Contract within the time stated in the Appendix to Tender.
4. We agree to abide by this Tender for the period of 120 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 VII**SCHEDULE – A****ROYALTY
SCHEDULE II****(See sub rule (1) of Rule 36)**

Sl. No.	Name 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 Selling Price on advalorem basis or Rs.4,500 per m ³ 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 or Rs.1,500 per m ³ 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 advalorem basis or Rs.1,500 per m ³ which is higher.	Rs.500 per MT	Rs.375 per MT
	(B)(i) Pink and Red Granites (Ilkal Pink Variety) (i) Hungunda and Badami Taluk of Bagalkot District, Kustagi of Koppal District.	15% of Sale Value or of Average Selling Price on advalorem basis or Rs.1,200	Rs.1,000 per MT	Rs.400 per MT
	(ii) Pink and Red Granites, Gneiss and their structural varieties (other than Ilkal Pink Variety)	15% of Sale Value or of Average Selling Price on advalorem basis or Rs.1,800 Variety) per m ³ which is higher	Rs.600 per MT	Rs.350 per MT
	C) Grey and White Granites and their varieties: (i) Very fine grained Grey granite (Sira grey Variety) Price on Chintanmi, Siddlaghatta of Chikkaballapura District	15% of Sale Value or of Average Selling Price on advalorem basis or Rs.1,350 per m ³ which is higher.	Rs.500 per MT	Rs.350 per MT

	Hoskote of Bangalore District.			
	(ii) Grey and white granites and textural varieties having shades of grey, black and white colours (other than (i) above Entire State.	15% of Sale Value or of Average Selling Price on advalorem basis or Rs.1,050 per m ³ which is higher.	Rs.375 per MT	Rs.250 per MT
	(iii) Grey granite of Devanahalli Taluk of Bangalore Rural District and Chikkaballapur taluk of Chikkaballapur District	15% of Sale Value or of Average Selling Price on advalorem basis or Rs.600 per m ³ 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 Sale Value or of Average Selling Price on advalorem basis or Rs.1800 per m ³ which is higher.	Rs.900 per MT	
3	Quartzite and sand stone and their varieties suitable for use as Ornamental Stone- Entire State	15% of Sale Value or of Average Selling Price on advalorem basis or Rs.1800 per m ³ 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 advalorem basis or Rs.1800 per m ³ 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 not exceed 20% of permit issued For Fullers Earth	Rs.60 per MT	Rs.70 per MT	
8	Limestone under the title "Shahabad Stone"	Rs.70 per 10 Sq meters or Rs.70 per MT	Rs.50 per 10 Sq meters 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 State	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)Murrum (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 waste rock 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- Entire State (See explanation 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 average selling price or of sale value whichever is higher on ad-valorem basis	400 per MT 300 per MT 200 per MT
22	Calcite	15% of average selling price or of sale 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	8% of average selling price or of sale value whichever is higher on ad-valorem basis.	80 Per MT
	ii)Processed	12% of average selling price or of sale value	600 per MT

		whichever is higher on ad-valorem basis	
24	Corundum	12% of average selling price or 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 average 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 whichever is higher on ad-valorem basis	100 per MT
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 average selling price or of sale value whichever is higher on ad-valorem basis	100 per MT
33	Laterite i) /dispatched for use in cement or chemical industries or Abrasive or Refractory 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 average selling price or of sale value whichever is higher on	200 per MT

		ad-valorem basis	
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 household articles)	18% of average selling price or of sale value whichever is higher on ad-valorem basis	200perMT
	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 Average Selling Price on ad-valorem basis which is higher.

As per order of Deputy Director mines and Geological department dated 11-11-2021. The prevailing rates as per the updated order of the Geological Department during the course of the project will be applicable.

Note: 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 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 will be deducted at 5 times the royalty charges from the contractor's bills as per prevailing orders issued by the Authority.

____\$\$****\$\$____

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 **01.04.2024**

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	778.00	651.00	522.00
Semiskilled/ Unskilled Supervisory	862.00	734.00	610.00
Skilled/Clerical	948.00	862.00	734.00
Highly Skilled	1028.00	948.00	862.00

(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 /7(3)/2023-LS-II dated 02.04.2024.)

“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’	778.00
‘B’	651.00
‘C’	522.00

“Employment of Watch and Ward”-Rates of wages for employees employed in watch and ward – Govt. of India, Ministry of Labour

Area	Without arms	With arms
	Rates of wages Rs.	Rates of wages Rs.
‘A’	948.00	1028.00
‘B’	862.00	948.00
‘C’	734.00	862.00

For further details log on to Ministry of Employment