

Tender Notice No.003/SPV-CETP/JETL/ CIVIL, PEB & STRUCTURES /2023-24 Dated: 26.01.2024

NOTICE INVITING TENDER

FOR

UP-GRADATION OF CETP – CIVIL, PEB & STRUCTURES LIKE, CONSTRUCTION OF FOUNDATIONS FOR RO & SLUDGE STORAGE SHEDS, RCC STORAGE TANKS, HOPPER BOTTOM TANKS FOR WASTEWATER STORAGE AND TREATMENT AS PER THE ATTACHED DRAWING AT JEEDIMETLA EFFLUENT TREATMENT LTD. [JETL], PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL-MALKAJGIRI DIST., TELANGANA STATE, INDIA.

TENDER DOCUMENT

JEEDIMETLA EFFLUENT TREATMENT LTD.

Plot No.267, Phase-I, IDA, Jeedimetla, Medchal-Malkajgiri Dist., Hyderabad-500055

Ph.No.8886446201/040-23092141

Email : spvcetp@jetltd.org

Price. Rs. 10,000/-

UP-GRADATION OF CETP – CIVIL, PEB & STRUCTURES LIKE, CONSTRUCTION OF FOUNDATIONS FOR RO & SLUDGE STORAGE SHEDS, RCC STORAGE TANKS, HOPPER BOTTOM TANKS FOR WASTEWATER STORAGE AND TREATMENT AS PER THE ATTACHED DRAWING AT JEEDIMETLA EFFLUENT TREATMENT LTD. [JETL], PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL-MALKAJGIRI DIST., TELANGANA STATE, INDIA.

PUBLISH OF TENDER	: 26.01.2024
PRE-BID MEETING DATE & TIME	: 01.02.2024 FROM 11:00 A.M. TO 4:00 P.M.
PRE-BID MEETING VENUE	: JEEDIMETLA EFFLUENT TREATMENT LTD. PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL- MALKAJGIRI DIST., TELANGANASTATE, INDIA
SUBMISSION OF QUERIES	: 03.02.2024 BEFORE 5:00 P.M. THROUGH E-MAIL
REPLY TO QUERIES	: 06.02.2024 BEFORE 5:00 P.M. THROUGH E-MAIL
DATE & TIME OF SUBMISSION OF TENDER	: 02.03.2024 BEFORE 5:00 P.M. AT JETL
DATE & TIME OF OPENING OF TENDERS (TECHNICAL BID)	: 04.03.2024
DATE & TIME OF OPENING OF TENDERS) (COMMERCIAL BID)	: 12.03.2024

NOTE:

1. Payment should be made online for Tender Cost and EMD. Bank details are as follows.

Account Title: J E T L Upgradation Project

Account No.: 50200090196051

Name of the Bank & Branch: HDFC Bank Ltd.,
Ground Floor, Bank House, Roxana Palladium,
Rd Number 1, Shyam Rao Nagar, Banjara Hills,
Hyderabad, Telangana 500034

IFSC Code: HDFC0009817

2. Tender should be submitted in 2 packet system (Technical Bid with proof of Tender Cost payment and EMD paid receipts and Commercial Bid).
3. The dates stipulated above are firm and under no circumstances they will be relaxed unless otherwise extended by an official notification or happens to be Public Holidays.

SUBMISSION OF TENDER:

JEEDIMETLA EFFLUENT TREATMENT LTD.

Plot No.267, Phase-I, IDA, Jeedimetla, Medchal-Malkajgiri Dist.

Hyderabad-500055

Ph.No.8886446201/040-23092141

Email : spvcetp@ietltd.org

1. Name of the Tenderer:

2. Tenderer Address:

3. a. PAN No. of the Firm:

b. GST No:

4. Authorized Representative Name:

Mobile No:

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NAME OF PROJECT:

UP-GRADATION OF CETP – CIVIL, PEB & STRUCTURES LIKE, CONSTRUCTION OF FOUNDATIONS FOR RO & SLUDGE STORAGE SHEDS, RCC STORAGE TANKS, HOPPER BOTTOM TANKS FOR WASTEWATER STORAGE AND TREATMENT AS PER THE ATTACHED DRAWING AT JEEDIMETLA EFFLUENT TREATMENT LTD. [JETL], PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL-MALKAJGIRI DIST., TELANGANA STATE, INDIA.

Office Inviting Tenders:

1. Tenders are invited for the above -mentioned work from the Eligible Contractors or Contracting firms having registration with or without Government. Contractors should have experience in construction of RCC Industrial Wastewater Storage Tanks of Capacity – 500 KL and above, construction of Hopper bottom tanks. The details of Tender conditions and terms can be downloaded from the link <https://jetltd.org>

2. Approximate Estimate Contract value of work: **Rs. 6,50,00,000/-**

3. E.M.D. for Rs 6,00,000/- shall be paid through Net banking/RTGS/NEFT in favor of

JETL Upgradation Project

Account No. 50200090196051,

Name of the Bank: HDFC Bank Ltd.,

Branch: Ground Floor, Bank House, Roxana Palladium,

Road No. 1, Shyam Rao Nagar, Banjara Hills,

Hyderabad, Telangana – 500034

IFSC Code: HDFC0009817

- a) All the tenderers shall invariably submit the proof of Payment towards Tender Cost and EMD and this will be the primary requirement to consider the bid as responsive. The Company shall carry out the technical bid evaluation solely based on the submitted certificates/documents, documents towards EMD and open the price bids of the responsive tenderers. The Company will notify the successful tenderer for submission of original hard copies of all submitted documents, documents towards EMD prior to entering into agreement.
- b) The Successful tenderer shall invariably furnish the original documents towards EMD, Certificates/documents of the submitted scanned copies of the tender inviting authority before entering into the agreement either personally or through courier or post and the receipt of the same within the stipulated date shall be the responsibility of the successful tenderer. The Company will not take any responsibility for any delay in receipt/non-receipt of original documents towards EMD, certificates/documents from the successful tenderer before the stipulated time. On receipt of documents, the Company shall ensure the genuineness of the BG towards EMD and all other certificates/documents submitted by the tenderer in support of qualification criteria before concluding the agreement.
- c) If any successful tenderer fails to submit the original hard copies towards EMD and other documents within the stipulated time, the successful tenderer will not be considered.

4. Period of completion of work: 12 Months
5. Form of contract – Item rate contract.
6. The Tender Committee of JETL reserves the right to accept or reject any or all the tenders in full or part thereof, which in their opinion justifies such an action, without further explanation to the Tenderer.

Procedure for submission of Tenders:

Tenderers need to contact the following for technical clarifications.

Mr. K. Narayana Swamy

Asst. General Manager

Email: knsamy@jetltd.org for information on Tender.

1. All the Tenderers shall invariably submit the documents as proof towards Tender Cost and EMD, this will be the primary requirement to consider the bid as responsive.
2. The Company shall carry out the technical bid evaluation solely based on the submitted certificates / documents, documents as proof towards Tender Cost & EMD and open the price bids of the responsive tenderers.
3. The Company will notify the successful tenderer for submission of original hard copies of all submitted documents, documents as proof towards Tender Cost & EMD prior to entering into agreement.
4. The successful tenderer shall invariably furnish the original documents towards EMD, certificates / documents of the submitted scanned copies to the Tender Inviting Authority before entering into agreement either personally or through courier or post and the receipt of the same with in the stipulated date shall be the responsibility of the successful tenderer. The Company will not take any responsibility for any delay in receipt / non receipt of original documents towards EMD, certificates / documents from the successful tenderer before the stipulated time. On receipt of documents, the Company shall ensure the genuinity of the documents towards EMD and all other certificates, documents submitted by the tenderer in support of the qualification criteria before concluding the agreement.
5. If any successful tenderer fails to submit the original Hard copies of submitted certificates / documents, documents towards EMD with in the stipulated time or if any variation is noticed between the submitted documents and the hard copies submitted by the tenderer, the successful tenderer will be cancelled from participating in the tender.
6. The successful (L1) tenderer shall furnish the original hard copies of all the documents / certificates / statements submitted by him before concluding the agreement.
7. The tenderers shall be required to furnish a declaration stating that the documents submitted by them are genuine. Any incorrectness/deviation noticed will be viewed seriously and apart from canceling the work duly forfeiting the EMD.

8. The data filled in by the tenderer in the submitted form shall be the sole criteria for the evaluation of responsiveness and assessing the bid capacity and any other supplemental data shall not be accepted by the tender accepting authorities for evaluation.
9. The tenderer is solely responsible for the correctness of the particulars furnished in bid form.
10. Such submitted documents pertaining Technical Bid need to be attached to the tender while submitting the bids. All the tenderers shall invariably submit the copies of documents towards Tender Cost & EMD and this will be the primary requirement to consider the tender as responsive. The Company shall carry out the technical bid evaluation solely based on the submitted certificates/documents, towards Tender Cost & EMD and open the price bids of the responsive tenderers. The Company will notify the Successful tenderer for submission of original hard copies of all submitted documents, towards EMD prior to entering into the agreement.
11. To qualify for consideration of the contract each tenderer should fulfill the following criteria:
 - a) The bidder should have **satisfactorily completed similar works** of value not less than **Rs.3,00,00,000/-** as a Prime Contractor in the same name and style in any one year during the financial years 2018-2019 to 2022-2023 updated to 2023-2024 price level. Subcontractor's / GPA holder's experience shall not be considered.
 - b) The works shall be in any State Govt./Central Govt./CPWD/MES/PSUs/Pvt organizations and the tenderer has to furnish the experience certificates issued by concerned and countersigned by officer of rank equivalent.
 - c) The tenderer shall submit details of existing Commitments of works and Statement of works for which tenders are submitted as per the Proforma available in the tender schedules along with supporting documents certified by an officer of rank equivalent to Executive Engineer concerned and countersigned by officer of rank equivalent to Authorized person of company or higher showing the balance value of work to be done and balance period of completion.
 - d) The Bidder should have executed the **minimum quantities** of items of work as given below in any one year during the financial years 2018-2019 to 2022-2023.
The bidder shall enclose certificate issued by the govt of the State/Central Company's/CPWD/MES/PSUs/Pvt organizations not below the rank of Executive Engineer or equivalent and countersigned by the officer of the rank of Authorized person of company or equivalent.

Sl. No	Item	Min. Qty. of item required
1	VRCC/VCC/PCC other than Slabs &	600

	Sunshades/Chajjas in Cum	
2	VRCC in Sqm	1000
3	Earth Work in cum	1500
4	Reinforcement steel	50MT
5	Masonry Work in sqm	5000
6	Plastering in sqm	10000

- e) The tenderer should further demonstrate the availability (either owned or leased) of the following **key and critical equipment**.

Sl. No	Item	Min. qty. of equipment required
1	Steel centering	15000sft
2	Pin Vibrators	1
3	Pan Vibrators	1
4	Concrete Mixers	1
5	QC lab	1

The tenderer has to possess certificate in support of owning machinery (or) a declaration on non-judicial stamp paper worth Rs.100/- as prescribed In Statement – V along with sufficient proof of owning such as invoice/certificate of registration by the competent authority in support of the critical equipment or the lease deed along with sufficient proof of owning the machinery.

- f) The tenderer must furnish the availability of the following key technical personal with adequate experience:
- 1 Nos. Graduate Engineers and 1 Nos Diploma Engineer (Civil) with not less than 5years of experience.
- g) The tenderer shall furnish a copy of the valid GST registration.
- h) The tenderer should furnish a copy of permanent account number (PAN) and copy of latest Income Tax returns submitted along with proof of receipt.
- i) The tenderer should submit the particulars in the format specified in the tender schedule along with necessary certificates.
- j) The tenderer should submit the particulars of information of litigation history.

- k) Liquid assets/credit Facilities/Solvency certificate from Nationalized Bank/Schedule banks of value not less than **Rs1,00,00,000/- issued not earlier than one year from date of submission of tender document.**

E.M.D. amounting to Rs.6,00,000/- shall be paid electronically through Net banking/RTGS/NEFT in favour of

JETL Upgradation Project

Account No. 50200090196051,

Name of the Bank: HDFC Bank Ltd.,

Branch: Ground Floor, Bank House, Roxana Palladium,

Road No. 1, Shyam Rao Nagar, Banjara Hills,

Hyderabad, Telangana – 500034

IFSC Code: HDFC0009817

- l) or unconditional and irrevocable Bank Guarantee issued by any Nationalized Bank /scheduled bank in the standard format given in tender schedule or **Rs.6,00,000/-** in favour of **JETL** along with bid documents to be valid for 12 months from the date of Tender.
- m) The Tenderer should submit signed undertaking of tender.
- n) The details and certificates are to be furnished as per the Proforma available in the tender schedules.

The tenderer is subjected to be black listed and the EMD forfeited if he is found to have misled or furnished false information in the forms / statements / certificates submitted in proof of qualification requirements or record of performance such as abandoning of work , not properly completed in earlier contracts, inordinate delays in completion of the works, litigation history and / or financial failures and /or participated in the previous tendering for the same work and had quoted unreasonable high bid prices

Even during execution of the work, if found that the contractor had produced false/fake certificates of experience he will be black listed and the contract will be terminated and his EMD will be forfeited.

Any further information can be obtained from the office of the Tender committee, JETL.

Procedure for Tender Submission

The Tenderers who are desirous of participating shall submit their technical bids, price bids etc., in the Standard formats prescribed in the Tender documents, displayed at JETL website.

INSTRUCTIONS TO TENDERERS

A – GENERAL

NAME OF THE PROJECT: UP-GRADATION OF CETP – CIVIL, PEB & STRUCTURES LIKE, CONSTRUCTION OF FOUNDATIONS FOR RO & SLUDGE STORAGE SHEDS, RCC STORAGE TANKS, HOPPER BOTTOM TANKS FOR WASTEWATER STORAGE AND TREATMENT AS PER THE ATTACHED DRAWING AT JEEDIMETLA EFFLUENT TREATMENT LTD. [JETL], PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL-MALKAJGIRI DIST., TELANGANA STATE, INDIA.

1. Scope of work:

a) Brief description and location of work:

Construction of Civil foundations for RO & Sludge storage sheds, RCC wastewater storage tank and hopper bottom tanks and fabrication, erection, and commissioning PEB & Structures of RO shed, sludge storage shed at Jeedimetla Effluent Treatment Ltd., Jeedimetla, Hyderabad - 055

Principal Components of the work: Civil, PEB & Structures

b) ECV put to tender: Rs. 6,50,00,000/-

c) Period of completion: 12 months from the date of agreement.

2. Mobilization Advance: Interest free mobilization advance at 20% of the project cost, the contractor should provide the Advance Bank Guarantee (ABG) for 20% of mobilization advance amount.

3. Payment Terms: The payments will be released as per RA – Bills (10% amount retained from Running Bills and EMD will be released after completion of work and on submission of Bank Guarantee (BG) for Retention Money of 5% of Project Cost.)

a) Details of provisions excluded in the ECV put to tender.

b) Goods and Service Tax (GST) : As per Tender condition No. **38 of Special Conditions**

c) Reimbursable provisions : GST as per Govt. guidelines

3.1 As per the directions issued by the Company, submission of original hard copies of the submitted copies of BG towards EMD and other certificates/documents by participating tenderers to the tender opening authority.

3.2 The tenders will be opened by the Tender Committee, JETL..

3.3 The successful tenderer shall invariably furnish all the original documents before concluding agreement.

3.4 The successful tenderer is expected to complete the work within the time period specified in the Tender.

4. Firms Eligible to Tender:

The Firms who

- i) Possess the valid registration in the class and category mentioned in the Tender Notice and satisfy all the conditions therein.
- ii) are not blacklisted or debarred or suspended by the Firms, companies for whatever the reason, prohibiting them from continuing in the contracting business.
- iii) have complied with the eligibility criteria specified in the Tender Notice and

are the eligible tenderers.

5. Qualification data of the Tenderers / qualification criteria for opening of the price Bid:

The tenderer shall submit the following particulars in the formats enclosed, supported by documentary evidence as specified in the formats.

- a) Check List to accompany the tender as per **Annexure-I**
- b) Attested copies of documents relating to the Registration of the firm, Registration as Civil Contractor
- c) The bidder should have satisfactorily completed similar works of value not less than Rs. 3,00,00,000/- as a Prime Contractor in the same name and style in any one year during the financial years 2018-2019 to 2022-2023 updated to 2023-2024 price level. Subcontractor's / GPA holder's experience shall not be taken into account. The works shall be in any State Govt./Central Govt./CPWD/MES/PSUs and the tenderer has to furnish the experience certificates issued an officer of rank equivalent to Executive Engineer concerned and countersigned by officer of rank equivalent to authorized member of the Company.
- d) The tenderer shall submit details of existing Commitments of works and Statement of works for which tenders are submitted as per the Proforma available in the tender schedules along with supporting documents certified by an officer of rank equivalent to Executive Engineer concerned and countersigned by officer of rank equivalent to Authorized person of company or higher showing the balance value of work to be done and balance period of completion.
- e) The Bidder should have executed the minimum quantities of items of work as given below in any one year during the financial years 2018-2019 to 2022-2023. The bidder shall enclose a certificate issued by the State/Central govt. Companies / CPWD/MES/PSUs not below the rank of Executive Engineer or equivalent and countersigned by the officer of the rank of Authorized person of company or equivalent.

Sl. No.	Item	Min. Qty. of item required
1	Earth Work	1500 Cum
2	VRCC	600 Cum
3	Reinforcement steel	50 T

- f) The tenderer should further demonstrate the availability (either owned or leased) of the following key and critical equipment.

Sl. No	Item	Min. qty. of equipment required
1	Steel centering	100 Tons
2	Pin Vibrators	1
3	Pan Vibrators	1
4	Concrete Mixers/Self Loader	2

5	QC lab	CTM/Slump Cone
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The tenderer has to submit either a certificate issued by the Executive Engineer not earlier than one year from date of submission of bids in support of owning machinery (or) a declaration on non-judicial stamp paper worth Rs.100/- as prescribed in Statement – V along with sufficient proof of owning such as invoice/certificate of registration by the competent authority in support of the critical equipment or the lease deed along with sufficient proof of owning the machinery.

- g) Assessed available Bid capacity as per formula (2AN-B) should be greater than the Estimated Contract Value as specified in the Tender Document.
 - h) The details and certificates are to be furnished as per the Proforma available in the tender schedules.
 - i) The particulars of quality control testing Lab owned / tie up with established quality control testing laboratories in Statement - VIII.
 - j) The proposed methodology and program of construction, backed up with equipment, planning and deployment, duly supported with broad calculations, justifying their capability of execution and completion of the work as per technical specifications within the stipulated period of completion as per milestones.
 - k) The tenderers shall be required to furnish a declaration stating that the document copies submitted by them are genuine. Any incorrectness / deviations noticed will be viewed seriously and apart from cancelling the work duly forfeiting the EMD.
 - l) The tenders will be opened by the Tender Committee, JETL. The price bid of the technically qualified tenderer only will be opened.
 - m) Any other details can be obtained from the Office of the JETL.
- Note:
- a) The tenderer shall sign all the statements /documents and certificates submitted by him owning the responsibility for their correctness/ authenticity.

b) Tenders from Joint Ventures are not accepted.

6. Bid capacity.

The tenderer who meets the above qualification criteria and whose available bid capacity is more than the estimated contract value will be qualified for opening of Price bid. The available bid capacity will be calculated as under:

Available Bid Capacity: 2AN-B.

Where,

A= Maximum value of Civil Engineering works executed in its name in any one financial year during the last five financial years (updated to current Price level) considering the works completed as well as works in progress.

N= Number of years prescribed for completion of the work for which Tenders are invited (12 months).

B= Updated value (at current price level), of all existing commitments i.e., ongoing works, works likely to be awarded to be executed during the next 12 months (Period of completion for which tenders are invited).

The annual turnover cost of completed works and balance works on hand etc., shall be updated by giving a weightage of 10% per year to bring them to current price level.

No relaxation will be given to any of the qualification criteria.

7. Even though the tenderers meet the above qualifying criteria, they are liable to be disqualified / debarred / suspended / blacklisted if they have
 - a) Furnished false / fabricated particulars in the forms, statements and /annexures submitted in proof of the qualification requirements and/or
 - b) Not turned up for entering into agreement, when called upon record of poor progress such as abandoning the work, not properly completing the contract, inordinate delays in completion, litigation history or financial failures etc. and/or participated in the previous bidding for the same work and had quoted unreasonably high tender percentage and
 - c) Even during execution of the work, if found that the work was awarded to the Contractor based on false / fake certificates of experience, the Contractor will be blacklisted and work will be taken over.
8. The contract price is inclusive of all overhead charges and include the following elements:
 - a) Site accommodation, setting up plant, access road, water supply, electricity and general site arrangements.
 - b) Office furniture, equipment and communications.
Expenditure on
 - c) Corporate office of Contractor.
 - d) Technical agents for site supervision.
 - e) Documentation and “as built” drawings.
 - f) Mobilization/ de-mobilization of resources.
 - g) Labour camps with minimum amenities and transportation to work sites.
 - h) Light vehicles for site supervision including administrative and managerial requirements.

- i) Laboratory equipment and quality control including field and laboratory testing. (For all the works contractors have to establish Quality Control laboratory).
- j) Minor T & P and survey instruments and setting outworks, including verification of line, dimensions, etc.
- k) Watch and ward.
- l) Traffic management/ Safety management during construction.
- m) Expenditure on safeguarding the environment.
- n) Sundries.
- o) Financing Expenditure.

9. One Tender per Tenderer

Each Tenderer shall submit only one Tender for the work. A Tenderer who submits more than one Tender will cause disqualification of all the Tenders submitted by the Tenderer.

10. Cost of Tendering

The Tenderer shall bear all costs associated with the preparation and submission of his Tender and the tender inviting authority will in no case be responsible and liable for those costs.

11. Site Visit

The Tenderer, at the Tenderer's own responsibility and risk is advised to visit and examine the Site of Work and its surroundings and obtain all information that may be necessary for preparing the Tender for entering a contract, for construction of the work. The costs of visiting the site shall be at the Tenderer's own expense.

B. TENDER DOCUMENT

1. Contents of Tender document

One set of Tender documents, comprises of the following:

Technical bid

- 1) Notice Inviting Tenders (NIT)
- 2) Instruction to Tenderer
- 3) Forms of Tender and qualification information
- 4) Conditions of Contract.
- 5) Specifications.
- 6) Drawings.
- 7) Forms of Securities. i.e., Tender Cost, EMD, Additional Security etc.

Price bid

1. Bill of Quantities and Price bid.

2. Clarification on Tender Documents

A prospective Tenderer requiring any clarification on Tender documents may contact the Tender Inviting Officer at the address indicated in the NIT. The Tender Inviting Tender Committee Authorized person will also respond to any request for clarification received through e-mail.

3. Amendment to Tender Documents

- a) Before the last date for submission of Tenders, the Tender Inviting Officer (TC, JETL) may modify any of the Contents of the Tender Notice, Tender documents by issuing amendment / Addendum.
- b) Any addendum/amendments issued by the Tender Inviting Officer shall be part of the Tender Document and it shall be attached to the Tender Notice on website.
- c) To give prospective Tenderers reasonable time to take an addendum into account in preparing their bids, the Tender Inviting Officer may extend, if necessary, the last date for submission of tenders.

C. PREPARATION OF TENDERS

1. Language of the Tender

All documents relating to the tender shall be in the English Language only.

2. Documents comprising of the Tender

- a) The tenderers who are desirous of participating shall submit their technical bids, price bids etc., in the standard prescribed format in the tender documents, displayed at website of JETL.
- b) If any of the certificates, documents etc., furnished by the tenderer are found to be false/fabricated/bogus, the tenderer will be blacklisted and the EMD forfeited.
- c) The technical bids will be opened by the Tender Committee, JETL at the time and date as specified in the tender documents. All the statements, documents, certificates, BGs etc., submitted by the tenderers will be evaluated by Tender Committee.

3. Bid Offer

- a) Bill of Quantities called Schedule “A” and the bid offer accompanies the tender document. It shall be explicitly understood that the Tender Committee does not accept any responsibility for the correctness or completeness of this schedule ‘A’ and this schedule ‘A’ is liable to alterations by omissions, deductions or additions at the discretion of the Tender Committee.
- b) The Schedule –A (or Price-bid) contains not only the quantities but also the rates worked out by the Company and the amount for each item and total value of the estimated contract. The tenderer should work out his own rates keeping in view the work, site conditions and quote his overall tender Rates with which he intends to execute the work.
 - i. All duties, taxes, and other levies payable by the contractor except GST as per State / Central government rules, shall be included in the tender Rates quoted by the tenderer.
 - ii. The tendered contract amount as computed based on overall tender item Rates is subject to variation during the performance of the Contract in accordance with variation in quantities etc.
- c. G.S.T as levied by the Govt. of India on transaction fee, electronic payment gateway charges are to be borne by the tenderers.

4. Validity of Tenders

- a) Tenders shall remain valid for a period of not less than three months from the last date for receipt of Tender specified in NIT.
- b) During the above-mentioned period no plea by the tenderer for any sort of modification of the tender based upon or arising out of any alleged misunderstanding of misconceptions or mistake or for any reason will be entertained.
- c) In exceptional circumstances, prior to expiry of the original time limit, the Tender Inviting Officer may request the tenderers to extend the period of validity for a specified additional period. Such request to the Tenderers shall be made in writing. A Tenderer may refuse the request without forfeiting his E.M.D. A Tenderer agreeing to the request will not be permitted to modify his Tender but will be required to extend the validity of his E.M.D. for a period of the extension.

5. Earnest Money Deposit

- a) E.M.D. amounting to Rs.6,00,000/-shall be paid electronically through Net banking/RTGS/NEFT in favour of JETL Upgradation Project, Account no.50200090196051, HDFC Bank Ltd. Banjara hills, Hyderabad, Telangana 500034. IFSC Code: HDFC0009817 or unconditional and irrevocable Bank Guarantee issued by any Nationalized Bank /scheduled bank in the standard format in favour of JETL along with bid documents to be valid for 12 months from the date of NIT.
- b) The successful tenderer should however pay the additional E.M.D. at Rs.6,00,000/- at the time of signing of the agreement shall be paid electronically through Net banking/RTGS/NEFT in favour of JETL Upgradation Project, Account no. 50200090196051, HDFC Bank Ltd. Banjara hills, Hyderabad, Telangana 500034. IFSC Code: HDFC0009817 or unconditional and irrevocable Bank Guarantee issued by any Nationalized Bank /scheduled bank in the standard format in favour of JETL along with bid documents to be valid for 12 months from the date of NIT.
- c) Online / manual payments / Bank Guarantees furnished towards EMD shall be valid for a period of 12 months from the date of tender notice.

6. Return of E.M.D. to unsuccessful Tenderer

The earnest money deposit will be refunded to the unsuccessful tenderer at the expiry of the period of validity of tender or the entrustment of the work to the successful tenderer whichever is earlier.

7. Return of EMD to successful tenderer

- a) The six Lakhs E.M.D paid by the successful tenderer before opening of the price bid will be discharged if the tenderer furnishes a bank guarantee for the full EMD amount at the time of concluding agreement.
- b) The earnest money deposited by the successful tenderer will not carry any interest and it will be dealt with as provided in the conditions stipulated in the tender. The E.M.D. given in the form of Bank Guarantee on a Nationalized / Scheduled Bank, shall be valid for the duration of contract period and in case any valid extension of contract period is granted, the validity of BG shall also be extended for the corresponding period. The Bank Guarantee on Nationalized / Scheduled Bank furnished by the tenderer towards additional security amount shall be valid till the work is completed in all respects.
- c) The E.M.D. shall be forfeited
 - i. if the Tenderer withdraws the Tender during the validity period of Tender.
 - ii. in the case of a successful Tenderer, if he fails to sign the Agreement for whatever reason.
- d) In consideration of the JETL Project of Tenders undertaking to investigate and to take into account each tender and in consideration of the work thereby involved, all earnest monies deposited by the tenderer will be forfeited to the Company in the event of such tenderer either modifying or with-drawing his tender at his instance within the said validity period of three months.

8. Signing of Tenders

- a) If the tender is made by an individual, it shall be signed with his full name and his address shall be given. If it is made by a firm, it shall be signed with the co-partnership name by a member of the firm, who shall also sign his own name, and the name and address of each member of the firm shall be given, if the tender is made by a Company, it shall be signed by a duly authorized officer who shall produce with his tender satisfactory evidence of his authorization. Such a tendering Company may be required before the contract is executed, to furnish evidence of its corporate existence. Tenders signed on behalf of G.P.A holder will be rejected.
- b) The tender shall contain no alterations or additions, except those to comply with instructions issued by the tender inviting officer, or as necessary to correct errors made by the tenderer, in which case all such corrections shall be initialed by the person signing the tender.
- c) No alteration which is made by the tenderer in the contract form, the conditions of the contract, the drawings, specifications or statements / formats or quantities accompanying the same will be recognized, and, if any such alterations are made the tender will be void.

D. SUBMISSION OF TENDERS

Submission of Tenders

The Tender document should be dropped in the Tender Box at JETL as per the stipulated date and time with all relevant documents.

E. TENDER OPENING AND EVALUATION

1. Tender opening

The Technical bids will be opened by the Tender Committee, JETL at the time and date as specified in the Notice Inviting Tender. All the Statements, documents, certificates, Demand Draft etc., submitted by the Tenderers for technical evaluation. The technical bids will be evaluated against the specified parameters / criteria and the technically qualified tenderers will be identified.

2. Clarification on the Technical Bid

The tender opening authority may call upon any tenderer for clarification on the statements, documentary proof relating to the technical bid.

3. Price Bid Opening

3.1 Only the Price Bids of qualified Tenderers whose technical Bids are found satisfying the eligibility criteria shall be opened on the date and time fixed.

3.2 The Price Bid of the Unqualified Tenderers will not be opened.

3.3 Tenders shall be scrutinized in accordance with the conditions stipulated in the Tender document. In case of any discrepancy of non-adherence conditions the Tender accepting authority shall communicate the same which will be binding both on the tender opening authority and the Tenderer. In case of any ambiguity, the decision taken by the Tender Accepting Authority on tenders shall be final.

4. Evaluation and Comparison of Price Bids

4.1 The Tender Committee, JETL will evaluate and compare the price bids of all the qualified Tenderers.

4.2 Negotiations at any level are strictly prohibited. However, good gesture rebate, if offered by the lowest tenderer prior to finalization of tenders may be accepted by the tender accepting authority.

4.3 Selection of Tenderer among the lowest & equally quoted tenderers will be in the following orders:

- a) The tenderer whose bid capacity is higher will be selected.
- b) In case the bid capacity is also same the tenderer whose annual turnover is more will be preferred.
- c) Even if the criteria incidentally become the same, the turnover on similar works and thereafter machinery available for the work and then the clean track record will be considered for selection.

5. Process to be Confidential

5.1 Information relating to the examination, clarification, evaluation and comparison of Tenders and recommendations for the award of a contract shall not be disclosed to

Tenderers or any other persons not officially concerned with such process until the award to the successful Tenderer has been announced by the tender accepting authority. Any effort by a Tenderer to influence the processing of Tenders or award decisions may result in the rejection of his Tender.

5.2 No Tenderer shall contact the Tender Committee, JETL with finalization of tenders on any matter relating to its Tender from the time of the Tender opening to the time the Contract is awarded. If the Tenderer wishes to bring additional information to the notice of the ED, JETL, he should do so in writing.

5.3 Before recommending / accepting the tender, the tender recommending / accepting authority shall verify the correctness of certificates submitted to meet the eligibility criteria and specifically experience. The authenticated agreements of previous works executed by the lowest tenderer shall be called for.

F. AWARD OF CONTRACT

1. Award Criteria

- 1.1 The Tender Committee, JETL will recommend to Tender Approving Authority for award of the contract to the Tenderer who is found technically qualified as per the Tender conditions and whose price bid is lowest.
- 1.2 The tender approving authority reserves the right to accept or reject any Tender or all tenders and to cancel the Tendering process, at any time prior to the award of Contract, without thereby incurring any liability to the affected Tenderer or Tenderers or any obligation to inform the affected Tenderer or Tenderers of the reasons for such action.

2. Notification of Award and Signing of Agreement

- 2.1 The Tenderer whose Tender has been accepted will be notified of the award of the work prior to expiration of the Tender validity period by registered letter / e-mail. This letter (hereinafter and in the Conditions of Contract called “Letter of Acceptance”) will indicate the sum that the Executive Director, JETL. 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 Amount”).
- 2.2 When a tender is accepted the concerned tenderer shall attend the office of the Executive Director, JETL concerned on the date fixed in the Letter of acceptance. Upon intimation being given by the Executive Director, JETL, of acceptance of his tender, the tenderer shall make payment of the balance E.M.D., and additional security deposit wherever needed by way of electronically through Net banking/RTGS/NEFT in favour of JETL Upgradation Project, Account no.50200090196051, HDFC Bank Ltd. Banjara hills, Hyderabad, Telangana 500034. IFSC Code: HDFC0009817 or unconditional and irrevocable Bank Guarantee issued by any Nationalized Bank /scheduled bank in the standard format in favour of JETL along with bid documents to be valid for 12 months from the date of NIT.
- 2.3 The written agreement to be entered into between the contractor and ED, JETL shall be the foundation of the rights and obligations of both the parties and the contract shall not be deemed to be complete until the agreement has first been signed by the contractor and then by the ED to enter contract on behalf of the JETL.
- 2.4 The successful tenderer has to sign an agreement within a period of 7 days from the date of receipt of communication of acceptance of his tender. On failure to do so his tender will be cancelled duly forfeiting the E.M.D., paid by him without issuing any further notice and action will be initiated to blacklist the tenderer.

3. Corrupt or Fraudulent Practices

The TC, JETL. require that the tenderers / suppliers / contractors under ED, JETL financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the ED, JETL

- a) define for the purposes of the provision, the terms set forth below as follows:
 - i. “Corrupt practices” means the offering, giving, receiving or soliciting of anything of value to influence the action of an ED, JETL official in procurement process or in contract execution: and

- ii. "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 Executive Director, JETL and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish in Tender prices at artificial non-competitive levels and to deprive the Executive Director, JETL of the benefits of free and open competition.
- b) Will reject a proposal for award if it determines that the Tenderer recommended for award has engaged in corrupt or fraudulent practices in competing for the contract in question.
- c) Will blacklist / or debar a firm, either indefinitely or for a stated period of time, if at any time determines that the firm has engaged in corrupt or fraudulent practices in competing for, or in executing an Executive Director, JETL Contract.
- d) Furthermore, Tenderers shall be aware of the provisions stated in the General Conditions of Contract.

STATEMENT – I

Details of value of Civil & PEB works executed in each year during the last five financial years by the Tenderer.

S. No.	Financial Year	Value in Rs.
1.	2018-2019	
2.	2019-2020	
3.	2020-2021	
4.	2021-2022	
5.	2022-2023	

Attach certificate(s) issued by the concerned and counter signed by Authorized person of company or equivalent authority showing work wise / year wise value of work done in respect of all the works executed by the Tenderer during last five years.

OR

Certificate from Chartered Accountant supported with Annual Balance sheet tallying with IT certificate.

Signature of the Tenderer

STATEMENT – II

Details of similar works completed in the name of the Tenderer during the last five financial years.
Details of Similar Single work completed in the Name of the Tenderer during the last five financial years.

S. No.	Name of the work	Address of Agreement Concluding Authority	Agreement No. & dated.	Value of Contract
1	2	3	4	5

Stipulated period of completion	Actual date of completion	Value of work done year wise during the last 'five' years.					Total value of work done
		1 st Year	2 nd Year	3 rd Year	4 th Year	5 th Year	
6	7	9	10	11	12	13	14

- A.** The bidder should have satisfactorily completed similar works of value not less than **Rs. 3,00,00,000/-** as a Prime Contractor in the same name and style in any one year during the financial years 2018-2019 to 2022-2023 updated to 2023-2024 price level. Subcontractor's / GPA holder's experience shall not be taken into account.

The works shall be in any State Govt./Central Govt./CPWD/MES / Private industries and the tenderer has to furnish the experience certificates issued by Executive Engineer concerned and counter signed by Authorized person of company or equivalent authority in support of the value of work experience.

Signature of the Tenderer

STATEMENT – III

Physical quantities executed by the Tenderer in the last five financial years. [work wise / year wise].

Physical quantities executed by the Tenderer in the last five financial years. [Work wise / year wise].

S. No	Financial Year	Name of work	Agt.No	Quantities executed / Year wise.					Plaster ing	Any other items.
				EWE	Any CC.	VRCC	Masonry	HYSD		
1	2	3	4	5	6	7	8	9	10	11
1										

The Bidder should have executed the minimum quantities of items of work as given below in any one year during the financial years 2018-2019 to 2022-2023.

The bidder shall enclose certificate issued by the State/Central govt. Companies/CPWD/MES/PSUs / Private industries not below the rank of Executive Engineer or equivalent and countersigned by the officer of the rank of Authorized person of company or equivalent.

S.No	Item	Min. Qty. of item required
1	VRCC/VCC/PCC other than Slabs & Sunshades/Chajjas in Cum	600
2	VRCC in Sqm	1000
3	Earth Work	1500
4	Reinforcement steel	50MT
5	Masonry Work	5000
6	Plastering	10000

Signature of the Contractor

STATEMENT – IV**Details of Existing Commitments.**

Details of works on hand and yet to be completed as on the date of submission of the Tender and works for which Tenders have been submitted are to be furnished.

A) Existing Commitments on ongoing works:

S.No	Name of work	Address of Agt. Concluding authority	Agt No. & Date	Value of contract	Stipulated period of completion	Value of work done so far	Balance Value of works to be completed	Anticipated date of completion	Updated value of balance work
1	2	3	4	5	6	7	8	9	10

Attach certificates issued by the Executive Engineer concerned and countersigned by Authorized person of company or equivalent authority, indicating the balance work to be done, and likely period of completion.

Signature of the Contractor

B) Details of works for which Tenders are submitted [awarded / likely to be awarded]

S.No	Name of work	Address of Agt. Concluding authority	Estimated value of work	Stipulated period of completion	Date on which tender was Submitted	Present stage of Tender
1	2	3	4	5	6	7

Signature of the Contractor

STATEMENT – V**Availability of Critical Equipment**

The tenderer should furnish the information required below, regarding the availability of the equipment required for construction / quality control.

S.No	Details of Equipment	Number Required	Number		
			Owned	Leased	To be Procured
1	2	3	4	5	6

Signature of the Contractor

A declaration regarding the equipment owned shall be produced by the Tenderer on a non-judicial stamp paper of Rs. 100/- as below along with sufficient proof of owning such equipment through invoice /certificate of registration by the competent authority

DECLARATION

“I, _____ do hereby solemnly affirm and declare that I /we own the following equipment for using on the subject work and also declare that I / We will abide by any action such as disqualification or determination of Contract or blacklisting or any action deemed fit, if the Company detects at any stage that I/we do not possess the equipment listed below.

S. No.	Details of each Equipment	No.	Year of purchase	Regn. Number	Capacity	Any other data	Is it in working condition?
1	2	3	4	5	6	7	8

Or

Submit a certificate issued by an officer not below the rank of Executive Engineer issued not earlier than one year from date of submission of tenders in support of owning machinery.

STATEMENT – VI

Availability of Key Personnel

Qualification and experience of Key Personnel proposed to be deployed for execution of the Contract.

S.No	Name	Designation	Qualification	Total Experience	Working with the Tenderer since

Signature of the Contractor

STATEMENT – VII

Information on litigation history in which Tenderer is the Petitioner.

S. No	Case No. / Year	Court where filed.	Subject Matter / Prayer in the case.	Répondants	Present Stage.
1	2	3	4	5	6

Signature of the Contractor

STATEMENT - VIII**DECLARATION** (on a non judicial stamp paper of Rs.100/-)

"I, _____ do hereby solemnly affirm and declare that I /we own / leased the following equipment for using on the subject work and also declare that I / We will abide by any action such as disqualification or determination of Contract or blacklisting or any action deemed fit, if the Company detects at any stage that I/we do not possess the equipment listed below.

S. No.	Details of each Equipment	Numbers required	Own	Leased
1	2	3	4	5
1	Vernier Calipers 0-150 mm	1 Nos.		
2	Screw gauge 0-25 mm	1 Nos.		
3.a	Measurement tapes both Steel (3.0 m, 5.0 m) & Fibre (15.0 m) 30 cm steel scale	2 Nos. each 2 Nos		
4	Weighing Machines 5.0 kg capacity	1Nos.		
5	Sieves for Coarse aggregate	1 Nos.		
6	Sieves for fine aggregate	1Nos.		
7	Cube moulds ISI marked 150 x150 x 150 mm (6 nos.)	12 Nos.		
8	Compression testing machine 100 MT, hand operated /arrangement for testing at approved lab.	1 Nos.		
9	Slump cone	1Nos.		
10	Carpenter's square 150mm with graduations	1 Nos.		
11	Electrical Megger 1100 V	1 Nos.		
12	Spirit level	2 Nos.		
13	Plum bobs	2 Nos.		
14	Measuring Jars (2) 250ml	2 Nos.		
15	Magnetic compass	2 Nos.		

SIGNATURE OF THE TENDERER

UNDERTAKING OF TENDERER

Date:

To

The Executive Director, JETL,

.....

Sir,

I / We do hereby tender and if this tender be accepted, under take to execute the following work viz. "as shown in the drawings and described in the specifications deposited in the office of the Executive Director, JETL, with such variations by way of alterations or additions to, and omissions from the said works and method of payment as provided for in the "conditions of the contract" for the sum of Rupees **Rs..... /- (.....in words)** or such other sum as may be arrived under the clause of the standard preliminary specifications relating to "Payment on item rate basis on final measurements"

I/WE have also quoted Rates for Items on E.C.V., in Schedule 'A', annexed (in words and figures) for which I/We agree to execute the work when item rate payment under the terms of the agreement is varied by payment on measurement quantities.

I/WE have quoted Rates to execute on E.C.V., in Schedule 'A' both in words & figures. In case of any discrepancy between the Rates on E.C.V., in words and figures, the rates quoted in words only shall prevail.

I/WE agreed to keep the offer in this tender valid a period of Three month(s) mentioned in the tender notice and not to modify the whole or any part of it for any reason within above period. If the tender is withdrawn by me/us for any reasons whatsoever, the earnest money paid by me/us will be forfeited to Executive Director, JETL.

I/WE hereby distinctly and expressly, declare and acknowledge that, before the submission of my/our tender I/We have carefully followed the instructions in the tender notice and that I/We have made such examination of the contract documents and the plans, specifications and quantities and of the location where the said work is to be done, and such investigation of the work required to be done, and in regard to the material required to be furnished as to enable me/us to thoroughly understand the intention of same and the requirements, covenants, agreements, stipulations and restrictions contained in the contract, and in the said plans and specifications and distinctly agree that I/We will not hereafter make any claim or demand upon the ED, JETL based upon or arising out of any alleged misunderstanding or misconception /or mistake on my/or our part of the said requirement, covenants, agreements, stipulations, restrictions and conditions.

I/WE enclosed to my/our application for tender schedule submitted
(No.....dated:.....) for
Rs.....as earnest money not to bear interest.

I/WE shall not assign the contractor or sublet any portion of the same except the conditions in clause 5.1 of General conditions of contract. In case if it becomes necessary such subletting with the permission of the Executive Engineer shall be limited to (1) Labour contract, (2) Material contract, (3) Transport contract and (4) Engaging specialists for special item of work enjoined in A.P.S.S.

IF MY/OUR tender is not accepted the sum shall be returned to me/us on application when intimation is sent to me/us of rejection or at the expiration of three months from last date of receipt of this tender, whichever is earlier. If my/our tender is accepted the earnest money shall be retained by the Executive Director, JETL as security for the due fulfillment of this contract. If upon written intimation to me/us by the JETL Office, I/We fail to attend the said office on the date herein fixed or if upon intimation being given to me/us by the ED, JETL or acceptance of my/our tender, and if I/We fail to make the additional security deposit or to enter into the required agreement as defined in condition-3 of the tender notice, then I/We agree the forfeiture of the earnest money. Any notice required to be served on me/us here under shall be sufficiently served on me/us if delivered to me/us hereunder shall be sufficiently served on me/us if delivered to me/us personally or forwarded to me/us by post to (registered or ordinary) or left at my/our address given herein. Such notice shall if sent by post be deemed to have been served on me/us at the time when in due course of post it would be delivered at the address to which it is sent.

I/WE fully understand that the written agreement to be entered into between me/us and ED, JETL shall be the foundation of the rights of the both the parties and the contract shall not be deemed to be complete until the agreement has first been signed by me/us and then by the proper officer authorised to enter into contract on behalf of JETL.

I AM/WE ARE professionally qualified and my/our qualifications are given below:

Name	Qualified

I/WE will employ the following technical staff for supervising the work and will see that one of them is always at site during working hours, personally checking all items of works and pay extra attention to such works as required special attention (e.g.) Reinforced concrete work.

Name of members of technical staff proposed to be employed	Qualification

I / WE declare that I/WE agree to recover the salaries of the technical staff actually engaged on the work by the Company, from the work bills, if I/We fail to employ technical staff as per the tender condition.

TENDERERS / CONTRACTOR'S CERTIFICATE.

1. I/WE hereby declare that I/We have perused in detail and examined closely the Standard Specifications, all clauses of the preliminary specifications with all amendments and have either examined all the standards specifications or will examine all the standard specifications for items for which I/We tender, before I/We submit such tender and agree to be bound and comply with all such specifications for this agreement which I/We execute in the JETL Company.
2. I/WE certify that I/We have inspected the site of the work before quoting my Percentage excess or less on ECV, I /We have satisfied about the quality, availability and transport facilities for stones, sand and other materials.
3. I/WE am/are prepared to furnish detailed data in support of all my quoted rates, if and when called upon to do so without any reservations.
4. I/WE hereby declare that I am/we are accepting to reject my tender in terms of condition 8 of instructions to bidders
5. I/WE hereby declare that I/We will not claim any price escalation beyond the scope of the Executive Director, JETL orders issued from time to time.
6. I/WE hereby declare that I am/we are accepting for the defect liability period as 12 months + 12 + 1 month instead of 6 months under clause 28 of APSS.
7.
 - a) I/WE declare that I/WE will procure the required construction materials including earth and use for the work after approval of the JETL. The responsibility for arranging and obtaining the land for borrowing or exploitation in any other way shall rest with me/us for the materials for construction, I/WE shall ensure smooth and un-interrupted supply of materials.
 - b) I/WE declare that the responsibility for arranging and obtaining the land for disposal of spoil/soil not useful for construction purposes shall rest with me/us.
 - c) I/WE declare that I/WE shall not claim any compensation or any payment for the land so arranged for disposal of soil and the land for borrow area. My/our quoted percentage excess or less ECV., are inclusive of the land so arranged and I/We will hand over the land so arranged for disposal of soil to; the Company after completion of work.

d) I/WE declare that I/WE will not claim any extra amount towards any material used for the work other than the quoted works for respective schedule 'A' items.

8. I/WE declare that I/WE will execute the work as per the mile stone programme, and if I/WE fail to complete the work as per the mile stone programme I abide by the condition to recover liquidated damages as per the tender conditions.

9. I/WE declare that I/WE will abide for settlement of disputes as per the tender conditions.

DECLARATION OF THE TENDERER

- 1) I/WE have not been black listed in any Company / Dept. of State / Central Govt due to any reasons.
- 2) I/WE have not been demoted to the next lower category for not filing the tenders after buying the tender schedules in a whole year and my/our registration has not been cancelled for a similar default in two consecutive years.
- 3) I/WE agree to disqualify me/us for any wrong declaration in respect of the above and to summarily reject my/our tender.

I / We, _____ have gone through carefully all the Tender conditions and solemnly declare that I / we will abide by any penal action such as disqualification or black listing or determination of contract or any other action deemed fit, taken by, the Company against us, if it is found that the statements, documents, certificates produced by us are false / fabricated.

Address of the Tenderer :

Phone No.:

Mail id :

Signature of the Tenderer

Note: If the tender is made by an individual, it shall be signed with his full name and his address shall be given. If it is made by a firm, it shall be signed with the co-partnership name by a member of the firm, who shall also sign his own name, and the name and address of each member of the firm shall be given, if the tender is made by a Dept. it shall be signed by a duly authorised officer who shall produce with his tender satisfactory evidence of his authorisation. Such tendering Dept. may be required before the contract is executed, to furnish evidence of its corporate existence. Tenders signed on behalf of G.P.A. holder will be rejected

CONDITIONS OF CONTRACT

A. GENERAL

1. Interpretation

1.1 In interpreting these Conditions of Contract, singular also means plural, male also means female, and vice-versa. Headings have no significance. Words have their normal meaning under the language of the contract unless specifically defined. The TC, JETL will provide instructions clarifying queries about the conditions of Contract.

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

- 1) Agreement
- 2) Letter of Acceptance, notice to proceed with the works.
- 3) Contractor's Tender (Technical bid)
- 4) Conditions of contract
- 5) Specifications
- 6) Drawings
- 7) Bill of quantities (Price-bid)
- 8) Any other document listed as forming part of the Contract.

2. ED, JETL, Decisions

Except where otherwise specifically stated, the ED, JETL will decide the contractual matters between the Company and the Contractor in the role representing the Company.

3. Delegation

The ED, JETL may delegate any of his duties and responsibilities to other officers and may Cancel any delegation by an official order issued.

4. 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)

5. Personnel

5.1 The Contractor shall employ the required Key Personnel named in the Schedule of Key Personnel to carry out the functions stated in the Schedule or other personnel approved by the ED, JETL. The JETL 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.

5.2 Schedule of Key Personnel

The successful tenderer shall have to employ the following technical staff on full time basis to be available at site.

One graduate Engineer	Five-year Experience
One Diploma Engineer	Three-year Experience
Three Technical Supervisors	Two-year Experience
One Safety Engineer	Five Year Experience

- 5.3 The employment of technical personnel shall be with reference to the estimate cost of work put to tender.
- 5.4 The appointment of technical staff shall be on a full-time basis.

The Technical staff shall be available at the work site to supervise the work including quality checking of all items from time to time. Failure to employ the required technical personnel by the contractor, amounts will be recovered at the following rates from the contractor:

Graduate Engineer: - Rs.37500/- per month.

The technical personnel shall be appointed on a full-time basis to be available at the site exclusively for this work. They shall be available at the work site for supervision of all materials, works, quality control, and to take instructions from ED, JETL whenever required by him.

- 5.5 The names of the technical personnel to be employed by the contractor should be furnished in the statement enclosed separately.
- 5.6 In case the contractor is already having more than one work on hand and has undertaken more than one work at the same time, he should employ separate technical personnel on each work.
- 5.7 If the contractor fails to employ technical personnel the work will be suspended or Company will engage a technical personnel and recover the cost thereof from the contractor.
- 5.8 If the ED, JETL asks the Contractor to remove a person who is a member of Contractor's staff or his work force stating the reasons the Contractor shall ensure that the person leaves the site forthwith and has no further connection with the work in the contract.
- 5.9 The technical personnel appointed by the contractor shall maintain the records and registers required by the Company like quality test registers, test reports, calibration records, site order book, check lists etc and sign them in proof of verifications, conduction of tests, compliance to instructions etc.
- 5.10 All costs and expenses associated with the employment of the above Technical personnel at site as above shall be borne by the Contractors.
- 5.11 If the contractor does not employ the technical person agreed to on the work for 30 days, thereafter it becomes a fundamental breach of contract.
- 5.12 ED, JETL is the sole judge to decide (a) whether qualified technical personnel is supervising the work and (b) the actual period of absence of such staff which requires the recovery and penalty to be enforced and his decision is final and binding on the contractor.

6. Contractor's Risks

All risks of loss or damage to physical property and of personnel injury and death, which arise during and in consequence of the performance of the Contract are the responsibility of the Contractor.

7. Insurance

The Contractor shall provide, in the name of the Company, insurance cover for personal injury or death of persons employed for construction to the JETL Project at the time of concluding agreement of the work

8. Site Inspections

8.1 The contractor should inspect the site and propose quarries of choice for materials source of water and quote his percentage including quarrying, conveyance and all other charges etc.

8.2 The responsibility for arranging the land for borrow area rests with the Contractor and no separate payment will be made for procurement or otherwise.

8.3 The Contractor has to make his own arrangement for accommodation to their Supervisors / Workers outside the JETL premises.

8.4 The work should be carried out in the premises between 8:30 a.m. to 6:00 p.m. If time extension is required, get permission from the ED, JETL in writing.

9. Contractor to Construct the Works

The Contractor shall construct and Commission the Work in accordance with the specifications and Drawings.

10. Power Supply

The contractor shall make his own arrangements for obtaining power from the Electricity dept., at his own cost. The contractor will pay the bills of electricity charges for the cost of power consumed by him.

11. Ramps

Ramps required during execution may be formed wherever necessary and same are to be removed after completion of the work. No separate payment will be made for this purpose.

12. Monsoon Damages

Damages due to rain or flood either in cutting or in banks shall have to be made good by the contractor till the work is handed over to the Company. The responsibility of de-silting and making good the damages due to rain or flood rests with the contractor. No extra payment is payable for such operations and the contractor shall, therefore, have to take all necessary precautions to protect the work done during the construction period.

13. 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 programme submitted by the Contractor, as updated with the approval of ED, JETL and complete the work by the Intended Completion Date.

14. Safety

The Contractor shall be responsible for the safety of all activities on the Site and before starting the work, he has to take the Work Permit from the Safety Officer of the JETL and has to follow all the safety rules of the Company (JETL).

15. Discoveries

Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the JETL. The Contractor is to notify the ED, JETL of such discoveries and carry out the ED, JETL instructions for dealing with them.

16. Possession of the Site

The Company shall give possession of the site to the Contractor. If possession of a part site is given, the Company will ensure that the part site so handed over is amenable to carry out the work on site by the Contractor.

17. Access to the Site

The Contractor shall provide the ED, JETL access to the site and to any place where the work, in connection with the Contract, is being carried out or is intended to be carried out.

18. Instructions

The Contractor shall carry out all instructions of the ED, JETL and comply with all the applicable local laws where the Site is located.

19. Settlement of disputes

19.1 If any dispute or difference of any kind whatsoever arises between the Company and the Contractor in connection with, or arising out of the Contract, whether during the progress of the works or after their completion and whether before or after the termination, abandonment or breach of the Contract, it shall in the first place, be referred to and settled by the ED, JETL who shall, within a period of thirty days after being requested by the Contractor to do so, give written notice of his decision to the Contractor. Upon receipt of the written notice of the decision of the ED, JETL the Contractor shall promptly proceed without delay to comply with such notice of decision.

19.2 If the ED, JETL fails to give notice of his decision in writing within a period of thirty days after being requested or if the Contractor is dissatisfied with the notice of the decision of the ED, JETL the Contractor may within thirty days after receiving the notice of decision appeal to the Company which shall offer an opportunity to the contractor to be heard and to offer evidence in support of his appeal, the Company shall give notice of his decision within a period of thirty days after the Contractor has given the said evidence in support of his appeal, subject to arbitration, as hereinafter provided. Such decision of the Company in respect of every matter so referred shall be final and binding upon the Contractor and shall forthwith be given effect to by the Contractor, who shall proceed with the execution of the works with all due diligence whether he requires arbitration as hereinafter provided, or not. If the Company has given written notice of his decision to the Contractor and no claim to arbitration has been communicated to him by the Contractor within a period of thirty days from receipt of such notice, the said decision shall remain final and binding upon the Contractor. If the Company fail to give notice of his decision, as aforesaid within a period of thirty days after being requested as aforesaid, or if the Contractor be dissatisfied with any such decision, then and in any such case the contractor within thirty days after the expiration of the first named period of thirty days as the case may be, require that the matter or matters in dispute be referred to arbitration as detailed below.

20. SETTLEMENT OF CLAIMS

- 20.1 All disputes or difference arising of or relating to the Contract shall be referred to the ED, JETL by arbitration.
- 20.2 The arbitration shall be conducted in accordance with the provisions of Indian Arbitration and Conciliation Act 1996 or any statutory modification thereof.
- 20.3 The arbitrator shall state his reasons for passing the award.
- 20.4 All claims are to be settled by a Civil Court of competent jurisdiction by way of civil suit and not by arbitration (at Hyderabad and Secunderabad only)
- 20.5 Overall Progress of work for the total work and Rate of progress for individual milestones shall be maintained throughout by the contractor and any reference of any dispute or difference to the authorities (JETL) or arbitration under these clauses shall not suffer the program of the work.

B. TIME FOR COMPLETION

1. Program

1.1 The total period of completion is 12 months from the date of entering with the agreement to proceed including rainy season. Keeping in view, the schedule for handing over of site given in condition 24.4 below, the work should be programmed such as to achieve the mile-stones as in "Rate of progress".

1.2 The attention of the tenderer is directed to the contract requirement at the time of beginning of the work, the rate of progress and the dates for the whole work and its several parts as per milestones. Time is the essence of the contract. The rate of progress and proportionate value of work done from time to time as will be indicated by the ED, JETL Certificate for the value of work done and completion of mile-stones will be required. Date of commencement of their programme will be the date for concluding agreement.

1.3 After signing the agreement, the contractor shall forthwith begin the work, and shall regularly and continuously proceed with them.

1.4 The following rate of progress will be required to be maintained by the contractor as a minimum. The start date of this work is the date of handing over of site and the contractor should take over the site within 7 days from the date of concluding the agreement. Contractor may give a separate time schedule for the completion of the whole work and the consideration will be given for accelerated programme. It is imperative that the work progress shall be ahead of the rate of progress given below.

Work programme of achieving the milestones (Statement)

Milestone No.	Period from the date of signing agreement	Minimum percentage of work to be completed. (Cumulative)
Milestone-1	4 months	35% of work to be completed
Milestone-2	8 months	75% of work to be completed
Milestone-3	12 months	100% of work to be completed

Note:

- i. The percentage of work to be completed is based on the contract work.
- ii. Site, schedule of programme of handing over site to the Contractor: Site will be handed over to the contractor immediately after entering into agreement.

1.5 The contractor shall commence the works on site within the period specified under condition 1.1 to 1.3 above after the receipt by him of a written order to this effect from the Authorized person of company and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the ED, JETL or be wholly beyond the contractor's control.

1.6 Save in so far as the contractor may prescribe, the extent of portions of the site of which the contractor is to be given possession from time to time and the order in which such portions shall be made available to him and, Subject to any requirement in the contract as to the order

in which the works shall be executed, the ED, JETL written order to commence the works, give to the contractor possession of so much of the site as may be required to enable the contractor to commence proceed with the execution of the works in accordance with the programme if any, and otherwise in accordance with such reasonable proposals of the contractor as he shall by written notice to the ED, JETL, make and will from time to time as the works proceed, give to the contractor possession of such further portions of the site as may be required to enable the contractor to proceed with the execution of the works with due dispatch in accordance with the said programme or proposals as the case may be; if the contractor suffers delay or incurs cost from failure on the part of the Authorized person of JETL to give possession in accordance with the terms of this clause, the Executive Director, JETL shall grant an extension of time for the completion of works.

1.7 The contractor shall bear all costs and charges for special or temporary way leases required by him in connection with access to the site. The contractor shall also provide at his own cost any additional accommodation outside the site required by him for the purposes of the work.

1.8 Subject to any requirement in the contract as to completion of any section of the works before completion of the whole of the works shall be completed in accordance with provisions of clauses in the Schedule within the time stated in the contract calculated from the last day of the period named in the statement to the tender as that within which the works are to be commenced or such extended time as may be allowed.

1.9 Delays and extension of time

No claim for compensation on account of delays or hindrances to the work from any cause whatever shall lie, except as hereafter defined. Reasonable extension of time will be allowed by the ED, JETL or by the office competent to sanction the extension, for unavoidable delays, such as may result from causes, which in the opinion of the ED, JETL, are undoubtedly beyond the control of the contractor. The ED, JETL shall assess the period of delay or hindrance caused by any written instructions issued by him, at twenty-five per cent in excess of the actual working period so lost.

In the event of the ED, JETL failing to issue necessary instructions and thereby causing delay and hindrance to the contractor, the latter shall have the right to claim an assessment of such delay by the JETL whose decision will be final and binding. The contractor shall lodge in writing with the JETL, a statement of claim for any delay or hindrance referred to above, within fourteen days from its commencement, otherwise no extension of time will be allowed.

Whenever authorized alterations or additions made during the progress of the work are of such a nature in the opinion of the JETL as to justify an extension of time in consequence thereof, such extension will be granted in writing by the ED, JETL or other competent authority when ordering such alterations or additions.

1.10 Construction Programme

- a) The Contractor shall furnish within 14 days of the order of the work a program showing the sequence in which he proposed to carry out the work, monthly progress expected to be

achieved, also indicating date of procurement of materials plant and machinery. The schedule should be such that it is practicable to achieve completion of the whole work within the time limit fixed and in keeping with the Milestone program specified and shall obtain the approval of the JETL. Further rate of the progress as in the program shall be kept up to date. In case it is subsequently found necessary to alter this program, the contractor shall submit sufficiently in advance the revised program incorporating necessary modifications and get the same approved by the JETL. No revised program shall be operative without the approval of ED, JETL.

- b) The ED, JETL shall have all times the right, without any way violating this contract, or forming grounds for any claim, to alter the order of progress of the works or any part thereof and the contractor shall after receiving such directions proceed in the order directed. The contractor shall also report the progress to the ED, JETL within 7 days of the JETL's direction to alter the order of progress of works.
- c) The Contractor shall give written notice to the ED, JETL whenever planning or progress of the works is likely to be delayed or disrupted unless any further drawings or order including a direction, instruction or approval is issued by the ED, JETL within a reasonable time. The notice shall include details of the drawing or order required and of why and by when it is required and of any delay or disruption likely to be suffered if it is late.

2. Speed of Work

2.1 The Contractor shall at all times maintain the progress of work to conform to the latest operative progress schedule approved by the ED, JETL. The contractor should furnish a progress report indicating the programme and progress once in a month. The ED, JETL may at any time in writing direct the contractor to slow down any part or whole of the work for any reason (which shall not be questioned) whatsoever, and the contractor shall comply with such orders of the ED, JETL. The compliance of such orders shall not entitle the contractor to any claim of compensation. Such orders of the ED, JETL for slowing down the work will however be duly taken into account while granting extension of time if asked by the contractor for which no extra payment will be entertained.

2.2 Delays in Commencement or progress or neglect of work and forfeiture of earnest money, Security deposit and withheld amounts:

If, at any time, the ED, JETL shall be of the opinion that the Contractor is delaying Commencement of the work or violating any of the provisions, the Contractor is neglecting or delaying the progress of the work as defined by the "Rate of progress" in the Articles of Agreement, he shall so advise the Contractors in writing and at the same time demand compliance in accordance with conditions of Tender notice. If the Contractor neglects to comply with such demand within seven days after receipt of such notice, it shall then or at any time, thereafter, be lawful for the ED, JETL to take suitable action in accordance with Clause.60 of APSS.

3. Suspension of works by the Contractor.

3.1 If the Contractor shall suspend the works, or sublet the work without sanction of the ED, JETL, or in the opinion of the ED, JETL shall neglect or fail to proceed with due diligence in the

performance of his part of the Contract as laid down in the Schedule rate of progress, or if he shall continue to default or repeat such default in the respects mentioned in clause 27 of the APSS, the ED, JETL shall take action in accordance with Clause 61 of APSS.

3.2 If the Contractor stops work for 28 days and the Stoppage has not been authorized by the ED, JETL the Contract will be terminated under Clause 61 of APSS.

3.3 If the Contractor has delayed the completion of works the Contract will be Terminated under Clause.61 of APSS.

4. Extension of the Intended Completion Date

4.1 The ED, JETL shall extend or recommend for extension, in accordance with the delegation of powers in force, the Intended Completion Date if a Variation is issued which makes it impossible for Completion to be achieved by the Intended Completion Date.

4.2 The ED, JETL shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the ED, JETL for a decision upon the effect of a 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.

5. Delays Ordered by the ED, JETL

The ED, JETL may instruct the Contractor to delay the start or progress of any activity within the Work.

6. Early Warning

6.1 The contractor is to warn the JETL at the earliest opportunity of specific likely future events or circumstances that may adversely affect the Execution of Works.

6.2 The Contractor shall co-operate with the JETL 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 ED, JETL.

7. Management Meetings

The ED, JETL may require the Contractor to attend a management meeting. The business of a management meeting shall be to review the programme for remaining work and to deal with matters raised in accordance with the early warning procedure.

C. QUALITY CONTROL

1. Identifying Defects

The ED,JETL 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 ED,JETL may instruct the Contractor to verify the Defect and to uncover and test any work that the ED, JETL considers may be a Defect.

2. Tests

If the ED,JETL instructs the Contractor to carry out a test not specified in the Specification to check whether any work has a Defect and the Contractor shall pay for the test and any samples.

3. Correction of Defects

3.1 The ED, JETL shall give notice to the Contractor of any Defects before the end of the Defects Liability Period, which begins on Completion. The defect liability period shall be extended for as long as defects remain to be corrected by the Contractor.

3.2 Every time notice of a Defect is given, the Contractor shall correct the notified defect within the length of time specified by the Engineer-in-Charge's notice.

4. Uncorrected Defects

4.1 If the contractor has not corrected the defect within the time specified in the JETL's notice, the ED, JETL will assess the cost of having the defect corrected and the contractor will pay this amount.

4.2 The ED, JETL may also introduce checklists, which shall be kept in Bound registers by the construction supervision staff. The contractor may be required to fill in these lists in the first instance and shall be subsequently checked by the Construction / Quality Control engineers.

5. Quality policy

The quality of construction shall be of highest standards. The materials, equipment, tools and plants and workmanship should be of high standards and acceptable quality conforming to the specifications. The contractor attention is directed to the requirements of materials under the clause "Materials and Workmanship" in the preliminary specifications of APSS. Materials conforming to the latest relevant I.S. Specifications and other approved Codes and Specifications shall be used on the work

6. Quality plan

The contractor shall draw quality plan based on the Quality Management System of ISO 9001-2000 and submit the same to the ED, JETL, before starting the work for his approval.

Quality plan for raw materials/ construction materials/ finished products/works: It shall be responsibility of the contractor to arrange for testing of all materials procured for the works under such consignment or at regular intervals as may be specified in APSS at his cost and only after the engineer is satisfied fully with the test results the materials of those consignments will be allowed to be utilized on the work. The contractor shall maintain a record of test results which shall be made available to the ED, JETL for the inspection.

The contractor shall collect various raw materials and construction materials well in advance before its use and shall get them tested as per the approved quality plan. No material shall be used unless it passes all the check/tests as per the acceptance criteria given and a record of all

checks/tests/ verifications shall be maintained at site. For all fixtures to doors and windows, supply of steel windows and flush wood doors, paints etc. the product marked ISI should be used and shall be of reputed and approved brand/make. Tests required to be conducted at outside laboratories shall be done at those labs which have availability of required instruments traceable to national standards and which are approved by the ED,JETL. Reports obtained from such labs should indicate the calibration status and traceability to national standards of their equipments for accepting the results.

7. Quality control

Establishment of Quality Control Laboratory: The contractor shall establish a quality control laboratory, at the site of work, equipped with calibrated equipment (as per list given below) to perform field tests, batch wise, for various materials, then and there itself, as per quality plan and standards.

The following minimum equipment should be made available at site by the contractor for testing of materials, samples, cubes etc.

Sl.No.	Description of Item	Recommended Calibration Frequency
1	Cube moulds ISI marked 150 x150 x 150 mm (12 nos.)	-
2	Compression testing machine 100 MT, hand operated	6 Months
3	Weighing Machine 5.0 kg capacity	6 Months
4.	Vernier Calipers 0-150 mm, Screw gauge 0-25 mm	1 year
5. a	Measurement tapes both Steel (3.0 m, 5.0 m) & Fibre (15.0 m)	At the time of purchase and the tapes to be changed after 6 Months, if any error is observed
5. b	30 cm steel scale	
6.	Sieves for Coarse aggregate & fine aggregate	-
7.	Slump cone	-
8.	Carpenter's square 150mm with graduations	
9.	Electrical Megger 1100 V	At the time of purchase
10.	Spirit level, Plum bob	-
11.	Measuring Jars (2) 250ml	-
12.	Magnetic compass	-

Calibration of Equipment: All the equipment maintained by the contractor at site shall be calibrated from time to time according to the calibration frequency mentioned, with calibrations traceable to National Standards. Records for proof of such calibrations done for each instrument, with instrument number shall be maintained by the contractor and shall be made available for verification / counter signature by the ED, JETL. Proper storage, handling and use of these instruments shall be ensured so that their calibration does not get disturbed due to weather factors etc. Frequency of the calibration shall be as decided by the ED, JETL.

8. Quality Registers

The contractor shall maintain the Quality Test Registers at site in the format specified and record therein the results of all the tests conducted. The relevant reports of the tests conducted shall be maintained in a separate file.

Return of Site documents:

All the site records/ documents mentioned therein shall be returned to the ED, JETL in full shape after the satisfactory completion of the work.

9. Quality Control Inspections

In addition to the normal inspections by the regular staff in charge of the construction of work, periodical inspection by the Executive Director or his nominees, the work will also be inspected the Architects and Project Management consultants for this project and any other authorized external quality control agencies. If any sub-standard materials, work or workmanship is noticed, action will be taken based on their observations and these will be affected by the JETL of the execution of the work.

10. Quality Audit

The Company may engage external agencies for conducting quality audit in which case the following methodology would be adopted:

- i) The external agencies shall conduct quality control tests as per the standard procedures in the presence of Construction and Quality Control Engineers and the Contractor.
- ii) The observations of the external agencies on the quality of work should be recorded then and there and signatures of all the concerned obtained as a token of acceptance of the observations.
- iii) If any sub-standard materials, work or workmanship is noticed, action will be taken based on their observations and these will be affected by the JETL of the execution of the work.

D. COST CONTROL

1. Bill of Quantities

1.1 The Bill of Quantities shall contain items for the construction work to be done by the Contractor.

1.2 The Contractor is paid for the quantity of the work done at the estimate rate in the Bill of Quantities for each item.

2. Changes in the quantities

2.1 The contractor is bound to execute all supplemental works that are found essential, incidental and inevitable during the execution of the main work.

2.2 The payment of rates for such supplemental items of work will be regulated as under;
Supplemental items directly deducible from similar items in the original agreement.

2.3 The rates shall be derived by adding to or subtracting from the agreement rate of such similar item the cost of the difference in the quantity of materials, labour between the new items and similar items in the agreement worked out with reference to the Schedule of Rates adopted in the sanctioned estimate with which the tenders are accepted.

2.4 Similar items but the rates of which cannot be directly deduced from the original agreement.

2.5 Purely new items which do not correspond to any item in the agreement.

2.6 The rates of all such items shall be Estimated Rates plus or minus overall Tender premium.

3. Extra Items

3.1 Extra items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the ED, JETL. The rates for extra items shall be worked out by the ED, JETL as per the conditions of the Contract and the same are binding on the Contractor.

3.2 The contractor Engineer should submit a statement of extra items if any that they have executed during the preceding month failing which the contractor shall submitted before the 15th day of each month, submit in writing to the not be entitled to claim any.

3.3 Entrustment of additional items:

- i. Wherever additional items not contingent on the main work and outside the scope of original agreement are to be entrusted to the original contractor dispensing with bids and if the value of such items exceeds the limits up to which the officer is empowered to entrust works initially to contractor without calling for tenders, approval of next higher authority shall be obtained. Entrustment of such items on nomination shall be at rates not exceeding the estimated rates.
- ii. Entrustment of the additional items contingent on the main work will be authorized by the officers up to the monetary limits up to which they themselves are competent to accept items in the original agreement so long as the total amounts up to which they are competent to accept in an original agreement rates for such items shall be worked out in accordance with the procedure (I) For all items of work in excess of the quantities shown in the Bill of Quantities of the Tenders, the rate payable for such items shall be estimate rates for the items (+) or (-) over all tender percentage accepted by the competent authority.

- iii. Entrustment of either the additional or supplemental items shall be subject to the provisions of the agreement entered into by a Competent Authority after the tender is accepted. The ED, JETL, being the authority next higher to the Authorized person of company, who entered into the agreement approves the rate for the items / variation in quantity in the current agreement. The items shall not be ordered by an officer on his own responsibility if the revised estimate or deviation statement providing for the same requires the sanction of higher authority (ED, JETL).

Note: It may be noted that the term Estimate Rate used above means the rate in the sanctioned estimate with which the tenders are accepted, or if no such rates is available in the estimate, the rate derived will be with reference to the Standard Schedule of Rates adopted in the sanctioned estimate with which tenders are accepted.

4. Cash flow forecasts

When the program is updated, the contractor is to provide the ED, JETL with an updated cash flow forecast.

5. Payment Certificates

- 5.1 The Contractor shall submit to the ED, JETL monthly statements of the estimated value of the work completed less the cumulative amount certified previously.
- 5.2 The ED, JETL shall check the Contractor's monthly statement within 14 days.
- 5.3 The value of work executed shall be determined by the ED, JETL.
- 5.4 The value of work executed shall comprise the value of the quantities of the items in the Bill of Quantities completed.
- 5.5 The ED, JETL 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.

6. Payments

The Payment for the work done by the contractor will be made for the finished work by the Company based on the measurements recorded in measurement books and check measured by the ED, JETL or Engineers.

6.1 Procedure

Application and format of the computerized M.B.

- a) The conventional Measurement Books shall be replaced by a bound volume of computerized measurements to be furnished by the contractor, duly machine numbered for the pages, and with the Measurement Book number given by the ED, JETL. The pages of these Measurement Books shall be of A-4 size. All these Computerized Measurement Books shall be serially numbered, and a record of these Computerized Measurement Books shall be maintained in a separate Register in the prescribed form.

b) The same format as in the existing Measurement Books shall be used for the Computerized Measurement Books. The Measurements shall be carried forward from the previous recorded measurements as per the existing procedure.

c) These measurement books will be retained by the ED, JETL and will be the property of the JETL

6.2 Mode of measurements

- i. The measurements shall be recorded and entered in computerized format in the first instance by the contractor, and a hard copy shall be submitted to the ED, JETL. All entries shall be made exactly as per the existing procedures.
- ii. These measurements shall then be 100% checked by the Assistant Engineer/Assistant General Manager or Executive Director (JETL). The contractor shall incorporate all such changes or corrections, as may be done during these checks, to his draft computerized measurements, and submit to the Company the corrected computerized measurements in the form of a book, duly hard bound in red colour on the lines of the conventional Measurement Books now in use, and with its pages machine numbered.
- iii. The Executive Director, JETL shall test check these computerized Measurements as per the existing instructions. This book shall be treated as a computerized measurement book.
- iv. The ED, JETL, shall record the necessary certificates for their checks as per the existing procedure in these Computerized measurement books.
- v. The Computerized Measurement Books shall be allotted a serial number as per the Register of Computerized Measurement Books, separately.

6.3 Cutting or over-writing in the computerized Measurement Books not allowed

- i. The Computerized Measurement Books given by the contractor, duly bound, with its pages machine numbered, shall have no cutting or over-writing without any loose sheets.
- ii. In case of any error, the Computerized Measurement Books shall be cancelled, and the contractor shall re-submit a fresh Computerized Measurement Book. This should be done before the corresponding computerized bill is submitted to the JETL for payment.
- iii. The contractor shall submit as many copies of Computerized Measurement Books as may be required, for the purpose of reference and record of the Company.

6.4 Computerized bill to be submitted by the contractor

- i. The contractor shall submit his running and final bills in a computerized form in the same format as the existing conventional bills, with all the pages machine numbered, and hard bound, and with all the entries made as per the existing procedure.
- ii. The contractor shall submit as many copies of the computerized bills as required for the purpose of reference and record in the Company.
- iii. The bill shall be carried forward from the previous running account bills as per the existing procedure.
- iv. These computerized bills shall be processed by the Company for payment, as per the existing procedure.
- v. When a payment is based on Standard Measurements, the following certificate should invariably be recorded on the bill, in his own handwriting, by the Engineer / AGM / ED (JETL), examining or verifying it: "Certified that the whole of the work billed for herein has been actually done, and that no portion thereof has been previously billed for in any shape."

7. Payments and Certificates

7.1 Payments shall be adjusted for recovery of advance payments, liquidated damages in terms of tender conditions and security deposit for the due fulfillment of the contract. Payment will be made to the Contractor under the certificate to be issued at reasonably frequent intervals by the ED, JETL, and intermediate payment will be the sum equal to 90% of the value of work done as so certified and balance of 10% will be withheld and retained as security for the due fulfillment of the contractor under the certificate to be issued by the ED, JETL. On completion of the entire works the contractor will receive the final payment of all the moneys due or payable to him under or by virtue of the contract except earnest money deposit retained as security and a sum equal to 5 percent of the total value of the work done. The amount withheld from the final bill will be retained under deposits and paid to the contractor together with the earnest money deposit retained as security after a period of 12 months as all defects shall have been made good according to the true intent and meaning thereof.

7.2 In case of over payments or wrong payments if any made to the contractor due to wrong interpretation of the provisions of the contract, APSS or Contract conditions etc., such unauthorized payment will be deducted in the subsequent bills or final bill for the work or from the bills under any other contracts with the JETL or at any time thereafter from the deposits available with the JETL.

7.3 Any recovery or recoveries advised by the ED, JETL Company, due to non-fulfillment of any contract entered into with the JETL by the contractor shall be recovered from any bill or deposits of the contractor.

7.4 No claim shall be entertained, if the same is not represented in writing to the ED, JETL within 15 days of its occurrence.

7.5 The contractor is not eligible for any compensation for the inevitable delay in handing over the site or for any other reason. In such a case, suitable extensions of time will be granted after considering the merits of the case.

8. Intermediate Payments
 - 8.1 For earthwork in cutting, 10% of the quantity will be with-held for intermediate payments and the same will be released after completing the work to the profiles as per drawings and disposal of the spoil material at the specified places and handing over the balance useful stone. For this purpose, a length of 25 m will be taken as a Unit.
 - 8.2 For earth work, embankment formation work, 10% of the quantity will be withheld for intermediate payments and the same will be released after completing the bund to the profiles as per drawings including trimming of side slopes and all other works contingent to the bund profile. For this purpose, 25 m of length will be taken as a Unit.
 - 8.3 For the structure works either with masonry or concrete where the height of structure is more than three meters, the quantities executed in the lower level will be withheld at the rate of one percent for every three meters' height, if the balance height of the structure work is more than three meters in being over the executed level and the same will be released only after the entire work is completed as certified by the ED, JETL.
9. Recovery towards useful materials like earth, stone etc recovered from earthwork excavation:

Recovery shall be made from the bills payable to the contractor towards the value of useful materials like sand, stone, clay, ballast, earth, trees and shrubs or other materials obtained in the excavation made or lying on the site of the work, either useful for reuse on the work or elsewhere.
10. Interest on Money due to the Contractor

No omission by the JETL to pay the amount due upon certificates shall vitiate or make void the contract, nor shall the contractor be entitled to interest upon any guarantee fund or payments in arrear, nor upon any balance which may, on the final settlement of his accounts, found to be due to him.
11. Certificate of Completion of works
 - 11.1 When the whole of the work has been completed and has satisfactory passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the ED, JETL accompanied by an undertaking to carry out any rectification work during the period of maintenance, such notice and undertaking shall be in writing and shall be deemed to be request by the Contractor for the ED, JETL to issue a Certificate of completion in respect of the Works. The ED, JETL shall, within twenty-one days of the date of delivery of such notice either issue to the Contractor, a certificate of completion stating the date on which, in his opinion, the works were completed in accordance with the Contract or give instructions in writing to the Contractor specifying all the Works which, in the JETL opinion, required to be done by the Contractor before the issue of such Certificate. The ED, JETL shall also notify the Contractor of any defects in the Works affecting completion that may appear after such instructions and before completion of the

Works specified therein. The Contractor shall be entitled to receive such Certificate of the Completion within twenty-one days of completion to the satisfaction of the ED, JETL of the Works so specified and making good of any defects so notified.

11.2 Similarly, the Contractor may request and the ED, JETL shall issue a Certificate of Completion in respect of:

- a) Any section of the Permanent works in respect of which a separate time for completion is provided in the Contract, and
- b) Any substantial part of the Permanent Works which has been both completed to the satisfaction of the ED, JETL and occupied or used by the Company.
- c) If any part of the Permanent Works shall have been completed and shall have satisfactorily passed any final test that may be prescribed by the Contract, the ED, JETL may issue such certificate, and the Contractor shall be deemed to have undertaken to complete any outstanding work in that part of the Works during the period of Maintenance.

12. Taxes

12.1 The rates quoted by the contractor shall be deemed to be exclusive of GST on all materials that the contractor will have to purchase for the performance of this contract. The contractor shall be responsible for the payment of taxes, duties, fees etc., wherever payable.

12.2 Any Central or State sales and other taxes on completed items of works of this contract as may be levied and paid by the contractor shall be reimbursed by the Company to the contractor on proof of payment to the extent indicated in Schedule-A.

13. Retention

The Company shall retain from each payment due to the contractor @ the rate of 10% of bill amount until completion of the whole of the works. On completion of the whole of the works, 5% of the total amount retained is re-paid to the Contractor along with final bill and 5% when the Defects Liability Period has passed and the ED, JETL has certified that all the Defects notified by the ED, JETL to the Contractor before the end of this period have been corrected.

14. Liquidated Damages

14.1 If for any reason, which does not entitle the contractor to an extension of item, the rate of progress of works, or any section is at any time, in the opinion of the Authorized person of company too slow to ensure completion by the prescribed time or extended time for completion Executive Director (JETL), shall so notify the contractor in writing and the contractor shall there upon take such steps as are necessary and the Authorized person of company (JETL), may approve to expedite progress so as to complete the works or such section by the prescribed time or extended time. The contractor shall not be entitled to any additional payment for taking such steps. If as a result of any notice given by the Executive Director (JETL), under this clause the contractor shall seek the Executive Director (JETL), permission to do any work at night or on Sundays, if locally recognized as days or

rest, or their locally recognized equivalent, such permission shall not be unreasonably refused.

- 14.2 If the contractor fails to complete whole of the works or any part thereof or section of the works within the stipulated periods of individual mile stones (including any bonafide extensions allowed by the competent authority without levying liquidated damages), the Authorized person of company may without prejudice to any other method of recovery will deduct one tenth of one percent of contract value per calendar day or part of the day for the period of delays subject to a maximum of 10% of the contract value not as a penalty from any monies in his hands due or which may become due to the contractor. The payment or deduction of such damages shall not relieve the contractor from his obligation to complete the works, or from any other of his obligations and liabilities under the contract.
- 14.3 The liquidated damages for the whole of the work will be filled up at the time of concluding agreement.

Milestone No.	Period from the date of signing agreement	Minimum percentage of work to be completed. (Cumulative)
Milestone-1	4 months	35% of work to be completed
Milestone-2	8 months	75% of work to be completed
Milestone-3	12 months	100% of work to be completed

The maximum amount of liquidated damages for the whole of the works is ten percent of final Contract price. The milestones will be filled at the time of agreement after obtaining a program of the work.

15. Mobilization Advance
Interest free mobilization advance at 20% of the Project cost as per the work order. The Contractor should provide the Advance Bank Guarantee (ABG) for 20% amount.
16. Repayment of Advance payment of Mobilization: It will be deducted in Final RA-Bill.
17. Securities
The Earnest Money Deposit and Additional Security shall be provided to the Company not later than the date specified in the Letter of Acceptance and shall be issued in an amount and form and by a bank acceptable to the Company. The Earnest Money Deposit shall be valid until a date 28 days from the date of expiry of Defects Liability Period and the additional security shall be valid until a date 28 days from the date of issue of the certificate of completion.
18. Cost of Repairs
Loss or damage to the Works or materials to the Works between the Start Date and the end of the Defects Correction Periods 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 OF THE CONTRACT

1. Completion

The Contractor shall request the ED, JETL to issue a Certificate of completion of the Works and the ED, JETL will do so upon deciding that the work is completed.

2. Taking Over

The Company shall take over the Site and the Works within seven days of the ED, JETL issuing a certificate of Completion.

3. Final Account

The Contractor shall supply to the ED, JETL a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The ED, JETL shall issue a Defects Liability Certificate and certify any final payment that is due to the Contractor within 56 days of receiving the Contractor's account if it is correct and complete. If it is not, the ED, JETL shall issue within 56 days a schedule that states the scope of the corrections or additions that are necessary. If the final Account is still unsatisfactory after it has been resubmitted, the ED, JETL shall decide on the amount payable to the Contractor and issue a payment certificate within 56 days of receiving the Contractor's revised account.

4. Termination

4.1 The Company may terminate the Contract if the contractor causes a fundamental breach of the Contract.

4.2 Fundamental breaches of Contract include but shall not be limited to the following.

- a) 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 ED, JETL.
- b) The Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation.
- c) The ED, JETL 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 ED, JETL.
- d) The Contractor does not maintain a security which is required.
- e) The Contractor has delayed the completion of works by the number of days for which the maximum amount of liquidated damages can be paid as defined.
- f) If the contractor, in the judgement of the Company has engaged in corrupt or fraudulent practices in competing for or in the executing the contract.
- g) The contractor has contravened Sub-Clause 5 of Conditions of Contract and sublet the work.
- h) The contractor does not adhere to the agreed construction program (Clause 24.1, 24.2, 24.3, 24.4 of Conditions of contract) and also fails to take satisfactory remedial action as per agreements reached in the managerial meeting (Clause 31) for a period of 15 days.

- i) The Contractor fails to carry out the instructions of ED, JETL within a reasonable time determined by the ED, JETL.

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 JETL and includes collusive practice among Tenderers (prior to or after Tender submission) designed to establish Tender prices at artificial non-competitive levels and to deprive the ED, JETL of the benefits of free and open competition.

4.3 Notwithstanding the above, the Company may terminate the contract for convenience.

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

5 Payment upon Termination

5.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the ED, JETL shall issue a certificate for the value of the work done less advance payments received upon 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. Additional Liquidated Damages shall not apply. If the total amount due to the Company exceeds any payment due to the Contractor, the difference shall be a debt payable to the Company.

5.2 In case of default for payment within 28 days from the date of issue of notice to the above effect, the contractor shall be liable to pay interest at 12% per annum for the period of delay.

6 Property

All materials on the Site, Plant, Equipment, Temporary Works and Works are deemed to be the property of the Company if the Contract is terminated because of Contractor’s default.

7 Release from Performance

If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the Company or the Contractor the ED, JETL shall certify that the contract has been frustrated. The Contractor shall make the site safe and stop work as quickly as possible after receiving this certificate and shall be paid for all works carried out before receiving it and for any work carried out afterwards to which commitment was made.

F. SPECIAL CONDITIONS

1. Water Supply

The Contractor has to make his own arrangements for the water required for the work and to the colonies and work sites, which are to be established by the Contractor.

2. Electrical Power

The contractor shall make his own arrangements for obtaining power from the Electricity dept., at his own cost. The contractor will pay the bills of electricity charges for the cost of power consumed by him.

3. Labour

The contractor shall make his own arrangements for the engagement of all staff and labour, local or other, and for their payment, housing, feeding and transport. Labour importation and amenities to labour and contractor's staff shall be to the contractor's account. His quoted rates shall include the expenditure towards importation of labour amenities to labour and staff; The contractor shall, if required by the ED, JETL, deliver to the ED, JETL a written in detail, in such form and at such intervals as the ED, JETL may prescribe, showing the staff and the numbers of the several classes of labour from time to time employed by the contractor on the Site and such information respecting Contractor's Equipment as the ED, JETL may require.

The contractor shall make his own arrangement for the daily transportation of the labour and staff from labour camps colonies to the work spot and no labour or staff of the contractor shall stay at the work spot. No extra payment will be made to the contractor for the above transportation of the labour and his quoted percentage to the work shall include the transportation charges of labour from colonies to work spot and back.

4. Safety Measures

- a. The contractor shall take necessary precautions for the safety of the workers and preserving their health while working in such jobs, which require special protection and precautions. The following are some of the measures listed but they are not exhaustive, and contractor shall add to and augment these precautions on his own initiative where necessary and shall comply with directions issued by the ED, JETL or on his behalf from time to time and at all times.
- b. Providing protective footwear to workers' situations like mixing and placing of mortar or concrete sand in quarries and places where the work is done under much wet conditions.
- c. Providing protective head gear to workers at places like underground excavations to protect them against rock falls.
- d. Providing masks to workers at granulators or at other locations where too much fine dust is floating about and sprinkling water at frequent intervals by water hoses on all stone crushing areas and storage bins abate to dust.
- e. Getting the workers in such jobs periodically examined for chest trouble due to too much breathing into fine dust.

- f. Taking such normal precautions like fencing and lightening in excavation of trenches, not allowing rolls and metal parts of useless timber spread around, making danger areas for blasting providing whistles etc.
- g. Supply work men with proper belts, ropes etc., when working in precarious slopes etc.
- h. Avoiding uninsulated electrical wire etc., as they would electrocute the works.
- i. Taking necessary steps towards training the workers concerned on the machinery before they are allowed to handle them independently and taking all necessary precautions in around the areas where machines hoists and similar units are working.

5. Fair Wage Clause

- a. The contractor shall pay not less than fair wages to laborers engaged by him on the work.
- b. "Fair" wages means wages whether for time of piecework notified by the ED, JETL from time in the area in which the work is situated.
- c. The contractor shall not with-standing the revisions of any contract to the contrary cause to be paid to the labour, in directly engaged on the work including any labour engaged by the sub-contractor in connection with the said work, as if the laborers had been directly employed by him.
- d. In respect of labour directly or indirectly employed in the works for the purpose of the contractor's part of the agreement the contractor shall comply with the rules and regulations on the maintenance of suitable records prescribed for this purpose from time to time by the Executive Director, JETL. He shall maintain his accounts and vouchers on the payment of wages to the laborers to the satisfaction of the JETL.
- e. The ED, JETL shall have the right to call for such record as required to satisfy himself on the payment of fair wages to the laborers and shall have the right to deduct from the contract amount a suitable amount for making good the loss suffered by the worker or workers by reason of the "fair wages" clause to the workers.
- f. The contractor shall be primarily liable for all payments to be made and for the observance of the regulations framed by the ED, JETL from time to time without prejudice to his right to claim indemnity from his sub-contractors.
- g. As per the contract labor (Regulation and abolition) Act. 1970 the contractor has to produce the license obtained from the licensing officers of the labour Company along with the tender or at the time of agreement.
- h. Any violation of the conditions above shall be deemed to be a breach of his contract.
- i. Equal wages are to be paid for both men and women if the nature of work is same and similar.
- j. The contractor shall arrange for the recruitment of skilled and unskilled labor locally and imported to the extent necessary to complete the work within the agreed period as directed by the ED, JETL in writing.

6. Indemnity Bond

NAME OF THE WORK: UP-GRADATION OF CETP – CIVIL & PEB WORKS LIKE, CONSTRUCTION OF FOUNDATIONS FOR RO & SLUDGE STORAGE SHEDS, RCC STORAGE TANKS, HOPPER BOTTOM TANKS FOR WASTEWATER STORAGE AND TREATMENT AS PER THE

ATTACHED DRAWING AT JEEDIMETLA EFFLUENT TREATMENT LTD. [JETL], PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL-MALKAJGIRI DIST., TELANGANA STATE, INDIA.

_____ contractor S/o. _____ aged _____ Resident of _____ do hereby bind myself to pay all the claims may come (a) under Workmen 's Compensation Act. 1933 with any statutory modification thereof and rules there under or otherwise for or in respect of any damage or compensation payable in connection with any accident or injury sustained (b) under Minimum wages Act 1948 (c) under payment of wages Act.1936 (d) under the Contractor labour (Regulation and Abolition) Act. 1970 by workmen engaged for the performance of the business relating to the above contract ie., Failing such payment of claims of workmen engaged in the above work, I abide in accepting for the recovery of such claims, effected from any of my assets with the Company's.

7. Compliance with Labor Regulations

During continuance of the contract, the contractor and his subcontractors 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 notifications that may be issued under any labour law in future either by the State or the Central government or the local authority and also applicable labour regulations, health and sanitary arrangements for workmen, insurance and other benefits. Salient features of some of the major labour laws that are applicable to the construction industry are given below. The contractor shall keep the Company indemnified in case any action is taken against Company 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 Company is caused to pay or reimburse, such amounts as may be necessary to cause or observe, or for non-observance of the provision stipulated in the notifications/bye laws/Acts/Rules/regulations including amendments, if any, on the part of the contractor, the ED, JETL Company shall have the right to deduct any money due to the contractor including his amount of performance security. The ED, JETL 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 Company. The employees of the Contractor and the Sub-contractor in no case shall be treated as the employees of the Company at any point of time.

8. Salient features of some major labour laws applicable to establishment engaged in Civil & PEB structural works

- (a) Workmen compensation Act 1923: The Act provides for compensation in case if 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 any employee has completed 5 years' service or more, or on death, 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 Company plus workers @ 10% or 8.33%. The benefits payable under the Act are:
 - i. Pension or 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 women employees in case of confinements 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 Company by Law. The Principal Company 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 Company if they employ 20 or more contract labour.
- (f) Minimum wages Act 1948: The Company is supposed to pay not less than the Minimum wages fixed by appropriate JETL 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 or Female workers and for not making discrimination against Female employee 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 payment of an annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs.2500/- per month or above and up to Rs.3500/- per month shall be worked out by taking wages as Rs.2500/- per month only. The Act does not apply to certain establishments. The newly set-up establishments are exempted for five years in certain circumstances. Some of the State

governments have reduced the employment size from 20 to 10 for the purpose of applicability of this Act.

- (j) Industrial Disputes Act 1947: The Act lays down the machinery and procedure for resolution of Industrial disputes, in what situations a strike or lock-out becomes illegal and what are the requirements for laying off or retrenching the employees or closing down the establishment.
- (k) Industrial Employment (Standing Orders) Act 1946: It is applicable to all establishments employing 100 or more workmen (employment size reduced by some of the State and Central government to 50). The Act provides for laying down rules governing the conditions of employment by the Company on matters provided in the Act and get the same certified by the designated Authority.
- (l) Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and Companies. The Trade Unions registered under the act have been given certain immunities from civil and criminal liabilities.
- (m) Child Labour (Prohibition & Regulation) Act 1986: The Act prohibits employment of children below 14 years of age in certain occupations and processes and provides for regulation of employment of children in all other occupations and processes; Employment Child Labour is prohibited in Building and Construction Industry.
- (n) Inter-State Migrant workmen's (Regulation of Employment & Conditions of service) Act 1979: The Act 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 an establishment to which this Act becomes applicable, are required to be provided certain facilities such as housing, medical aid, travelling expenses from home up to the establishment and back, etc.
- (o) 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 a rate not exceeding 2% of the cost of construction as may be modified by JETL. The Company 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 workplace etc. The Company to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the ED, JETL.
- (p) Factories Act 1948: The Act lays down the procedure for approval of plans before setting up a factory, health and safety provisions, welfare provisions, working hours, annual

earned leave and rendering information regarding accidents or dangerous occurrences to designated authorities. It is applicable to premises employing 10 person or more with aid of power or 20 or more persons without the aid of power engaged in manufacturing process.

9. Liabilities of the Contractor

a) Accident Relief and workmen compensation:

The contractor should make all necessary arrangements for the safety of workmen on the occurrence of the accident, which results in the injury or death of any of the workmen employed by the contractor, the contractor shall within 24 hours of the happenings of the accident and such accidents should intimate in writing to the ED, JETL of the Company the act of such accident. The contractor shall indemnify ED, JETL against all loss or damage sustained by the JETL. resulting directly or indirectly from his failure to give intimation in the manner aforesaid including the penalties or fines if any payable by Govt. as a consequence of Govt. failure to give notice under workmen's compensation Act or otherwise conform to the provisions of the said Act in regard to such accident.

b) In the event of an accident in respect of which compensation may become payable under the workmen's compensation Act VIII 23 whether by the contractor, by the ED, JETL it shall be lawful for the ED, JETL to retain such sum of money which may in the opinion of the ED, JETL be sufficient to meet such liability. The opinion of the ED, JETL shall be final in regard to all matters arising under this clause.

c) The contractor shall at all times indemnify the Govt. of Telangana / A.P / Other states. against all claims which may be made under the workmen's compensation act or any statutory modification thereafter or rules thereunder or otherwise consequent of any damage or compensation payable in consequent of any accident or injuries sustained or death of any workmen engaged in the performance of the business relating to the contractor.

10. Contractor's Staff, Representatives and Labor

(a) The contractor shall, at all times, maintain on the works staff of qualified Engineers, and Supervisors of sufficient experience of similar other jobs to assure that the quality of work turned out shall be as intended in the specifications. The contractor shall also maintain at work a Work Manager of sufficient status, experience and office and duly authorize him to deal with all aspects of the day-to-day work. All communications to any commitments by the Work Manager shall be considered as binding on the Contractor.

(b) The Contractor shall at all times submit details of skilled and unskilled labour and equipment employed to the ED, JETL in prescribed proforma as he may require to assess and ensure the proper progress of work.

- (c) If the contractor does not employ the technical person agreed to in the work a fine of Rs.25,000/- will be imposed. If he does not employ for 30 days, thereafter it becomes a fundamental breach of contract.

11. Accommodation and food

The contractor should arrange accommodation he needs, at his own cost. The contractor shall make his own arrangements for supply of food grains, fuel and other provision to his staff and laborers including controlled commodities.

12. Relationship

The contractor shall have to furnish information along with the tender, about the relationship he is having with any officer of the Company, ED, JETL engaged in the work and any officer of the rank of Assistant Secretary and above of the Company of JETL.

13. Protection of adjoining premises

The contractor shall protect adjoining sites against structural, decorative and other damages that could be caused by the execution of these works and make good at his cost any such damages.

14. Work during night or on Sundays and holidays

The works can be allowed to be carried out during night, Sundays or authorized holidays in order to enable him to meet the schedule targets and the work shall require MORT&H round the clock working keeping in view:

- (i) The provisions of relevant labour laws being adhered to:
- (ii) Adequate lighting, supervision and safety measures are established to the satisfaction of the ED, JETL and
- (iii) The construction programme given by the Contractor and agreed upon by the ED, JETL envisages such night working or working during Sundays or authorized holidays.

15. Layout of materials stacks

The contractor shall deposit materials for the purpose of the work on such parts only of the ground as may be approved by the ED, JETL before starting work. A detailed survey, clearly indicating position and areas where materials shall be stacked and sheds built is to be conducted by the contractor at his own cost and only after obtaining necessary approval of the plan for use of sites by the ED, JETL, the Contractor can use the sites accordingly.

16. Use of blasting materials

Blasting is not allowed at the workplace. If rocks cutting to be carried out by using machinery / manually.

17. Steel forms (Acrow Steel forms)

Acrow Steel forms or equivalent forms approved by ED, JETL should be used for all items involving and use of centering and shuttering shall be leak proof and single plane without any dents and undulations.

18. Inconvenience to public

The contractor shall not deposit materials at any site, which will cause inconvenience to the public. The ED, JETL may direct the contractor to remove such materials or may undertake the job at the cost of the contractor.

19. Conflict of interest

Any bribe, commission, gift or advantage given, promised or offered by on behalf of contractor or his partner, agent or servant or any one on his behalf to any officer, servant, representatives, agents of JETL, or any persons on their behalf, in relation to the obtaining or to execution of this, or any other contract with JETL shall in addition to any criminal liability, which it may occur, subject to the cancellation of this or all other contracts and also to payment of any loss or damage resulting from any such cancellation. ED, JETL shall then be entitled to deduct the amount, so payable from any money, otherwise due to the contractor under this or any other contract.

20. Contract documents and materials to be treated as confidential.

All documents, correspondence, decisions and orders, concerning the contract shall be considered as confidential and/or restricted in nature by the contractor and he shall not divulge or allow access to them by any unauthorized person.

21. General obligations of Contractor

- a) The contractor shall, subject to the provision of the contract and with due care and diligence, execute and maintain the works in accordance with specifications and drawings.
- b) The contractor shall promptly inform the Company and the ED, JETL of any error, omission, fault and such defect in the design of or specifications for the works which are discovered when reviewing the contract documents or in the process of execution of the works.
- c) If Contractor believes that a decision taken by the ED, JETL was either outside the authority given to the JETL by the Contract or that the decision was wrongly taken, the decision shall be referred to the technical expert within 14 days of the notification of the ED, JETL'S decisions.
- d) Pending finalization of disputes, the contractor shall proceed with the execution of work with all due diligence.

22. Security measures

- a) Security requirements for the work shall be in accordance with the ED, JETL's general requirements including provisions of this clause and the Contractor shall conform to such requirements and shall be held responsible for the actions of all his staff, employees and the staff and employees of his sub-contractors.
- b) All contractors' employees, representatives and subcontractor's employees shall wear identifications badges provided by the contractor. Badges shall identify the contractor, showing and employee's number and shall be worn at all times while at the site. Individual labour will not be required to wear identification badges.
- c) All vehicles used by the contractor shall be clearly marked with the contractor's name.
- d) The contractor shall be responsible for the security of the works for the duration of the contract and shall provide and maintain continuously adequate security personnel to fulfill these obligations. The requirements of security measures shall include, but not limited to maintenance of order on the site, provision of all lighting, fencing, guard flagmen and all other measures necessary for the protection of the works within the colonies, camps and elsewhere on the site, all materials delivered to the site, all persons employed in connection with the works continuously throughout working and non working period including nights, Sundays and holidays for duration of the contract.
- e) Other contractors working on the site concurrently with the contractor will provide security for their own plant and materials. However, their security provisions shall in no way relieve the contractor of his responsibilities in this respect.
- f) Separate payment will not be made for provision of security services and its cost shall be deemed to have been included in the offer of tender / contract.

23. Firefighting measures

- a) The contractor shall provide and maintain adequate firefighting equipment and take adequate fire precaution measures for the safety of all personnel and temporary and permanent works and shall take action to prevent damage to destruction by fire of trees shrubs and grasses.
- b) Separate payment will not be made for the provision of fire prevention measures.

24. Provisions of Health and Sanitation:

The contractor shall implement the sanitary and watch and ward rules and regulations for all forces employed under this contract and if the Contractor fails to enforce these rules, the ED, JETL

may enforce them at the expenses of the Contractor. The contractor's special attention is invited to clause 37, 38, 39 and 51 of the preliminary specification to the A.P.S.S. and he is required to provide at his own expense the following amenities to the satisfaction of ED, JETL concerned.

25. First Aid

At the work site there shall be maintained in a readily accessible place, first aid appliances and medicine including adequate supply of sterilized dressing and sterilized cotton wool. The appliance shall be kept in good order. They shall be placed under the charge of a responsible person, who shall be readily available during working hours.

26. Drinking water

Water of good quality for drinking purpose and sufficient quantity shall be provided for the workers.

27. Ecological balance

- a) The contractor shall maintain ecological balance by preventing de-forestation, water pollution and defacing the natural landscape. The contractor shall so conduct his construction operation as to prevent any unnecessary destruction, scarring, or defacing of the natural surroundings in the vicinity of the work. In respect of the ecological balance, Contractor shall observe the following instructions.
- b) Where unnecessary destruction, scarring, damage or defacing may occur, as a result of the operation, the same shall be repaired, replanted or otherwise corrected at the contractor's expense. The contractor shall adopt precautions when using explosives, which will prevent scattering of rocks or other debris outside the work area. All work areas, including borrow areas shall be smoothened and graded in a manner to conform to the natural appearances of the landscape as directed by the ED, JETL.
- c) All trees and shrubbery which are not specifically required to be cleared or removed for construction purposes shall be preserved and shall be protected from any damage that may be caused by the contractor's construction operation and equipment. The removal of trees and shrubs will be permitted only after prior approval by the ED, JETL. Special care shall be exercised where trees or shrubs are exposed to injuries by construction equipment, blasting, excavating, dumping, chemical damage or other operation and the contractor shall adequately protect such trees by use of protective barriers or other methods approval by the ED, JETL. Trees shall not be used for anchorages. The contractor shall be responsible for injuries to trees and shrubs caused by his operations. The term "injury" shall include, without limitation bruising, scarring, tearing and breaking of roots, trunks or branches. All injured trees and shrubs be restored as nearly as practicable without delay to their original condition at the contractor's expense.

- d) The contractor's construction activities shall be performed by methods that will prevent entrance or accidental spillage of solid matter contaminants, debris and other objectionable pollutants and wastage into the river. Such pollutants and waste include earth and earth products, garbage, cement concrete, sewage effluent, industrial wastes, radio-active substances, mercury, oil and other petroleum products, aggregate processing, mineral salts and thermal pollution. Pollutants and waste shall be disposed of in a manner and at sites approved by the ED, JETL.
- e) In the conduct of construction activities and operation of equipments the contractor shall utilize such practicable methods and devices as are reasonably available to control, prevent and otherwise minimize the air pollution. The excessive omission of dust into the atmosphere will not be permitted during the manufacture, handling and storage of concrete aggregates and the contractor shall use such methods and equipment as a necessary for collection and disposal or prevention of dust during these operations. The contractor's methods of storing and handling cement shall also include means of eliminating atmospheric discharges of dust, equipment and vehicles that give objectionable omission of exhaust gases shall not be operated. Burning of materials resulting from clearing of trees, bushes, combustible construction materials and rubbish may be permitted only when atmospheric conditions for burning are considered favorable.
- f) Separate payment will not be made for complying with the provisions of this clause and all cost shall be deemed to have been included in the unit rates and prices included in the contract if any provision is not complied with within a reasonable time even after issue of a notice in this respect, the necessary operations would be carried out by the ED, JETL at the cost of the Contractor, Orders of the ED, JETL in this respect would be final and binding on the contractor.

28. Preservation of existing vegetation

- a) The contractor will preserve and protect all existing vegetation such as trees, on or adjacent to the site which do not unreasonably interfere with the construction as may be determined by the ED, JETL. The contractor will be held responsible for all unauthorized cutting or damage to trees, including damage due to careless operation of equipment, stockpiling of materials or trekking of grass areas by equipment. Care shall be taken by the Contractor in felling trees authorized for removal to avoid any unnecessary damages to vegetation and tress that are to remain in place and to structures under construction or in existence and to workmen.
- b) All the produce from such cutting of trees by the contractor shall remain the property of JETL. and shall be properly stacked at site, approved by the ED, JETL. No payment whatsoever shall be made for such cutting and its stacking by the Contractor. If any produce from such cutting is not handed over to the ED, JETL, by the contractor, he shall be charged for the same at the rates to be decided by the ED, JETL. The recovery of this amount shall be made in full, from the intermediate bill that follows.

- d) The contractor shall also make arrangements for fuel deposits for supply of required fuel for the laborer to be employed for cooking purposes at his own cost in order to prevent destruction of vegetation growth in the surrounding area of the work site.

29. Possession prior to completion

The ED, JETL shall have the right to take possession of or use any completed part of work or works or any part thereof under construction either temporarily or permanently. Such possession or use shall not be deemed as an acceptance of any work either completed or not completed in accordance with the contract within the interest of Clause 28 of APSS except where expressly otherwise specified by the ED, JETL.

30. Payment upon termination

If the contract is terminated because of a fundamental breach of contract by the contractor, the ED, JETL shall issue a certificate for the value of the work done less advance payment received upon the date of the issue of the certificate 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 Company exceeds any payment due to the contractor the difference shall be a debt payable to the Company. In case of default for payment within 28 days from the date of issue of notice to the above effect, the contractor shall be liable to pay interest at 12% per annum for the period of delay.

31. Access to the contractor's books

Whenever it is considered necessary by the ED, JETL to ascertain the actual cost of execution of any particular extra item of work or supply of the plant or material on which advance is to be made or of extra items or claims, he shall direct the contractor to produce the relevant documents such as payrolls, records of personnel, invoices of materials and any or all data relevant to the item or necessary to determine its cost etc. and the contractor shall when so required furnish all information pertaining to the aforesaid items in the mode and manner that may be specified by the ED, JETL.

32. Drawing to be kept at site.

One copy of the drawings furnished to the contractor shall be kept by the contractor on the site and the same shall at all reasonable time be available for inspection and use by the ED, JETL and the JETL's representative and by any other persons authorized by the ED, JETL in writing.

33. B.I.S. [I.S.I.] books and APSS to be kept at site.

A complete set of Indian Standard specification referred to in "Technical Specifications" and A.P.S.S. shall be kept at site for reference.

34. Site Order Book

An order book shall be kept at the site of the work. As far as possible, all orders regarding the work are to be entered in this book. All entries shall be signed and dated by the Company Officer in direct charge of the work and by the contractor or by his representative. In important cases, the ED, JETL will countersign the entries, which have been made. The order book shall not be removed from the work, except with the written permission of the ED, JETL.

35. Variations by way of modification, omissions or additions for all modifications, omissions from or additions to the drawings and specifications, the ED, JETL will issue revised plans, or written instructions, or both and no modification, omission or addition shall be made unless so authorized and directed by the ED, JETL in writing.

The ED, JETL shall have the privilege of ordering modifications, omission or additions at any time before the completion of the work and such orders shall not operate to annul those portions of the specifications with which said changes do not conflict.

JETL's Decision:

It shall be accepted as in separable part of the contract that in matters regarding materials, workmanship, removal of improper work, interpretation of the contract drawings and contract specification, mode of the procedure and the carrying out of the work, the decision of the ED, JETL, which shall be given in writing, shall be binding on the contractor.

36. Income tax

- a) During the currency of the contract deduction towards income tax at 2.24% plus educational cess or as amended from time to time will be made from the gross value of each bill of the contract, as per section 194-C of the Income Tax Act. For deduction of tax at rates lower than 2.24% procedure stipulated under section 194-C (4) of Income Tax Act, 1961 shall be followed
- b) Income Tax clearance certificate should be furnished before the payment of final bill.
- c) The contractor's staff, personnel and labour will be liable to pay personnel income taxes in respect of their salaries and wages as are chargeable under the laws and regulations for the time being in force, and the contractor shall perform such duties in regard to such deductions thereof as may be imposed on him by such laws and regulations.

37. Seigniorage charges

37.1 The Rates of agreement items of works are exclusive of Seigniorage charges. Seigniorage charges will be recovered as per rules from the work bills of the contract or based on the theoretical requirement of materials, at the following rates:

RATES OF SEIGNIORAGE FEE: G.O.Ms No.18, I & C(M1) Dept., Dt.31.03.2022

Seigniorage charges will be recovered as per rules from the work bills of the contract or based on the theoretical requirement materials at the following rates.

S. No.	Material	Seigniorage
1.	Sand	Rs: 27.00 / Cum
2.	Metal	Rs: 65.00 / Cum
3.	R.R stone for masonry	Rs: 65.00 / Cum
4.	C.R.S stone	Rs: 65.00 / Cum
5.	Gravel. / Earth	Rs: 20.00 / Cum

37.2 The rates are liable to be revised and amended from time to time by the State govt. by notification in the 'Telangana Gazette'.

37.3 The Seigniorage charges are to be recovered as provided above in the agreement. Any escalation in these charges beyond the provisions of the agreement is to be borne by the Company debiting such escalated amount to the works estimate concerned.

37.4 In the case of a decrease in seignorage charges, the rate provided in the agreement will be recovered from the contractor and the difference amount will be credited to the work estimate.

37.5 The funds from DMF Trust is linked to the production of minerals & payment of seignorage fee i.e., 30% of contribution on seignorage fee for quarry leases on application basis @ 10% of contribution on seignorage fee for quarry leases granted through action rates w.e.f 12/01/2015 as per industries & commerce (mines-I) Dept., Lr No. 3573/M.I(1)/2015, DT: 13.05.2015 & Govt Memo 2939/Blgs(2)/2016-1, Dt: 26.05.2016. Engineering Companies executing civil works shall in addition to seignorage charges also recover 30% contribution towards DMF from contractors' bills & remit the scheduled banks & specified in 2nd schedule to RBI Act, 1934 & authorized by District Collector & Magistrate as chairperson of managing committee.

38. Goods and Services Tax (GST) On works contract: GST for the works contract shall be as per GST Act 2017 and will be implemented as per the orders of the Govt., from time to time. at present GST @ 18% of works contract will be applicable. It is the liability of the contractor to pay GST as applicable. The contractor will be reimbursed of the GST paid at 18% of each bill amount.

Labour CESS: As per the Building and other Construction Workers Welfare CESS Act, 1996, Section 3 of CESS Act, read with rule 4(3) of the cases rules and in accordance with S.O.No.2899, dt.28-03-1996 of central govt of India, 1% CESS will be deducted from the bills paid for works from the contractor.

39. Supply of construction materials

- i) The contractor must make his own arrangements for procurement, supply and use of construction materials.
- ii) All materials so procured should confirm to the relevant specifications indicated in the bidding documents.
- iii) The contractor shall follow all regulations of the Companies of India in respect of import licenses etc., of the procurement of the materials is through imports and he shall be responsible for the payment of applicable duties and taxes, port clearances, inland transportation etc.

- iv) The contractor shall make his own arrangements for adequate storage of the materials.

40. The contractor shall procure steel from TATA, SAIL, VSP & JSW Steel. They shall not be permitted to use steel bought from other manufacturers.

41. For Wall and floor tiles, Doors, windows & Fixtures, Paints, Water supply & Sanitary arrangements, the list of approved manufacturers/suppliers specified in SOR 2023-24 only shall be used.

TECHNICAL SPECIFICATIONS

[TO BE INCORPORATED AS PER REQUIREMENT OF THE WORK PUT TO TENDER DULY QUOTING THE RELEVANT SPECIFICATION NUMBER OF APSS. BSI Code No., MORT&H, etc. STANDARD SPECIFICATION NO.]

STANDARD SPECIFICATION FOR BUILDING WORK (AS PER A.P.S.S.)

All the items of work shall be executed as per the Standard Specifications laid down in APSS, the relevant I.S Codes of the Special Specification as indicated in Schedule - 'A' of the tender

Sl. No.	Name of the specification	Specification No.of.APSS
1.	STANDARD SPECIFICATION FOR MATERIALS	
1.01	General	101
1.02	Common Burnt Clay Brick	102
1.03	Broken Brick	103
1.04	Surki	104
1.05	Fly Ash	105
1.06	Rough Stones for dry packed Revetments and aprons	106
1.07	Stone for Masonry	107
1.08	Broken Stone/Coarse Aggregate for Concrete	108
1.09	Marble	109
1.10	Sand	110
1.11	Lime	111
1.12	Portland Cement of not less than '43' glade	112
1.13	Lime Mortar	113
1.14	Surki Mortar	114
1.15	Cement Mortar	115
1.16	Cement Lime Mortar	116
1.17	Sebara Putty (Lime Putty)	117
1.18	Pan Tiles	118
1.19	Burnt Clay Flat Terracing Tiles	119
1.20	Clay Roofing Tiles, Mangalore pattern	120
1.21	Glazed Tiles	121
1.22	Bitumen Felts for Water Proofing and Damp Proofing	122
1.23	Cuddapah/Shahbad Slabs	123
1.24	Galvanized Steel Sheets (Plain and Corrugated)	124
1.25	Un-reinforced Corrugated Asbestos Cement sheets	125
1.26	Steel for Reinforcement	126
1.27	Steel for Structural Work	127

Sl. No.	Name of the specification	Specification No.of.APSS
1.28	Asbestos Cement Flat Sheets	128
1.29	Water	129
1.30	Teak Wood	130
1.31	Bamboos	131
1.32	Ballies	132
1.33	Steel Sheets piling Sections	133
1.34	Bitumen Emulsion for Roads (Anionic Type)	134
1.35	Cut back Bitumen	135
1.36	Paving Bitumen	136
1.37	Coal Tar Pitch	137
1.38	Morrum	138
2.	STANDARD SPECIFICATIONS FOR CLEARING SITE, DISMANTLING BUILDING AND OTHER STRUCTURES AND BLASTING	
2.01	Clearing Site	201
2.02	Dismantling of Buildings and other Structures	202
2.03	Blasting	203
3.	STANDARD SPECIFICATIONS FOR EARTH WORK	
3.01	Excavation and Forming un compacted banks	301
3.02	Embankment compacted by other than driven equipment	302
3.03	Embankment compacted by power driven equipment	303
3.04	Clay blankets	304
3.05	Filters	305
3.06	Rock-fill in toe of embankment	306
3.07	Turfing	307
3.08	Excavation of foundation	308
3.09	Filling in foundations	309
3.10	Filling in Basement	310
3.11	Well sinking for foundations	311
3.12	Well sinking for Water Supply	312
3.13	RCC Precast and Cast-in-situ pile foundations	313
4.	STANDARD SPECIFICATIONS FOR CONCRETES	
4.01	lime Concrete and surki concrete	401
4.02	Cement Concrete for plain and reinforced works.	402
4.03	Reinforced cement concrete work	403
4.04	Repair grouting to aprons and revetments with surki Concrete and pointing with surki mortar	404
4.05	Prestressed concrete work.	405
5.	STANDARD SECIFICATIONS FOR BRICK MASONRY	
5.01	Brick Masonry-General	501

Sl. No.	Name of the specification	Specification No.of.APSS
5.02	Brick in Lime Mortar	502
5.03	Brick in Surki Mortar	503
5.04	Brick in Cement Mortar	504
5.05	Brick in Cement Lime Mortar	505
5.06	Brick in clay	506
5.07	Brick Arch work	507
5.08	Brick in Honey Comb work	508
5.09	Reinforced half-brick partition walls	509
5.10	Boiler Brick works	510
5.11	Honey Comb works with white washed pan tiles	511
5.12	Brick Nogging	512
6.	STANDARD SPECIFICATIONS FOR STONE MASONRY	
6.01	Stone Masonry-General	601
6.02	Cut stone in Lime Mortar	602
6.03	Cut stone in Surki Mortar	603
6.04	Cut stone in Cement Mortar	604
6.05	Cut stone-Rock Rustic or quarry faced in mortar	605
6.06	Cut stone string course and other cornice etc. in mortar	606
6.07	Cut stone arch work	607
6.08	Rubble arching	608
6.09	Coursed Rubble in Lime Mortar (1 st sort)	609
6.10	Coursed Rubble in Surki Mortar (1 st sort)	610
6.11	Coursed Rubble in Cement Mortar (1 st sort)	611
6.12	Coursed Rubble in Mortar (2nd sort)	612
6.13	Uncoursed Rubble or random rubble in lime mortar	613
6.14	Random Rubble in surki mortar	614
6.15	Random Rubble in Cement Mortar'	615
6.16	Random Rubble in Clay	616
6.17	Dry stone masonry (for retaining wall)	617
6.18	Damp proof (or any proof) course with Shahabad stone/Cuddapah stone 50mm thick in cement mortar 1:3	618
6.19	Rough stone dry packing for aprons and revetment	619
6.20	Laterite or rough stone pitching for fiver conservancy works	620
6.21	Moorum back to rough stone dry packing and gravelling to top and side slopes of bunds 150 mm thick	621
7.	STADARD SPECIFICATIONS FOR FLOORING GENERAL	
7.01	Flooring General	701
7.02	Flooring with Shahabad/Cuddapah slabs	702
7.03	Flooring with polished Shahabad/Cuddapah slabs	703

Sl. No.	Name of the specification	Specification No.of.APSS
7.04	Flooring with Cement Mortar (1 :3) 12mm thick	704
7.05	Flooring with coloured cement mortar (1 :3),12mm thick	705
7.06	Terraced flooring with brick on edge, 75mm thick broken brick aggregate concrete and 12mm thick cement plastering (1 :3) on top	706
7.07	Flooring with Glazed Tiles	707
7.08	Flooring with in-situ Terrazzo finish	708
7.09	Flooring with Cement Tiles (A) plain or coloured (B) Terrazzo (C) Chequered or embossed	709
7.10	In-situ-Granolithic concrete flooring	710
8.	STANDARD SPECIFICATIONS FOR ROOFING AND CEILING	
8.01	Roofing with pan tiles set mortar over flat tiles with lime mortar borders including reepers	801
8.02	Roofing with pan tiles and lime mortar borders including reepers	802
8.03	Roofing with Mangalore tiles set in mortar over flat tiles and including reepers	803
8.04	Roofing with Mangalore tiles including reepers	804
8.05	Roofing with Mangalore tiles over ceiling tiles with air spaces and including reepers	805
8.06	Madras terraced roofing with brick on edge 75mm thick broken brick aggregate concrete three courses flat tiles and three coats of lime plaster to top and bottom	806
8.07	Madras terraced roofing with brick on edge, 75mm thick broken brick aggregate concrete three courses of flat tiles and three coats of lime plaster to top and one coat of 12mm thick cement plaster (1 :3) to bottom	807
8.08	Terraced roofing with brick on edge, 75mm thick broken brick aggregate concrete two courses of flat tiles to top and one coat of cement plaster (1 :3) to bottom	808
8.09	Weatherproof course for reinforced cement concrete roofing with Lime broken brick aggregate concrete and two courses of flat tiles	809
8.10	Waterproof course for reinforced cement concrete roofing with two courses of flat tiles	810
8.11	Complete surface repair to leaky lime plastered terrace roof	811
8.12	Water proofing of concrete and masonry (flat or sloping) roofs with Bitumen felts Normal treatment	812
8.13	Water proofing of concrete and masonry (flat or sloping) roofs with Bitumen felts Heavy treatment	813
8.14	Roofing with corrugated galvanized steel sheets	814
8.15	Roofing with corrugated asbestos cement sheets	815

Sl. No.	Name of the specification	Specification No.of.APSS
8.16	Roofing with semi-corrugated asbestos cement sheets	816
8.17	False ceilings	817
9.	STANDARD SPECIFICATION FOR PLASTERING, POINTING, WHITEWASHING, COLOUR WASHING, DISTEMPERING AND WATER PROOF CEMENT PAINTING ETC.	
9.01	Plastering General	901
9.02	Plastering with lime mortar one coat, 12mm thick, including fine Rendering	902
9.03	Plastering with cement mortar, one coat 12mm or 20mm thick including fine rendering	903
9.04	Plastering with cement mortar 2 coats 20mm thick with sponge finish	904
9.05	Plastering with combination mortar, one coat 12mm thick including fine rendering	905
9.06	Pointing to masonry with cement mortar	906
9.07	Pointing to masonry with surki mortar	907
9.08	White washing	908
9.09	Colour-washing	909
9.10	Dry distempering	910
9.11	Oil bound distempering	911
9.12	Water proof cement painting	912
10.	STANDARD SPECIFICATIONS FOR WOOD WORK	
10.1	Wood work-General	1001
10.2	Doors, windows, ventilators, ward robes and cupboards etc.,	1002
10.3	Frame work for Roofs	1003
10.4	Wooden Partitions	1004
10.5	Wall Paneling	1005
10.6	Wooden Railing	1006
11.	STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL WORK	
11.01	Materials	1101
11.02	Steel work in single section of R.S. Joists, Flats, Tees Angles and Channels etc.	1102
11.03	Steel work Riveted and bolted in built-up sections, trusses and framed work	1103
11.04	Steel work (welded) in built-up sections trusses and Framed works	1104
11.05	Miscellaneous Steel work Collapsible steel structures	1105
11.06	M.S.Steel sliding shutters	1106
11.07	M.S. Sheet Doors	1107
11.08	Rolling Shutters	1108
11.09	Clamps for ceiling Fan	1109

Sl. No.	Name of the specification	Specification No.of.APSS
12.	STANDARD SPECIFICATIONS FOR PAINTING AND VARNISHING	
12.01	Painting-General	1201
12.02	Removing old paint with patent paint remover	1202
12.03	Removing old paint with caustic soda solution	1203
12.04	Removing old paint with blow lamp	1204
12.05	Painting with wood preservative	1205
12.06	Coal tarring	1206
12.07	Painting priming coat on wood, iron or plastered surfaces	1207
12.08	Painting with ready mixed paint	1208
12.09	Painting of Gl. sheets with ready mixed paint	1209
12.10	Spray painting with flat wall paint on new work including priming coat	1210
12.11	Spray painting with flat wall paint on old work	1211
12.12	Painting with synthetic enamel paint	1212
12.13	Painting with Aluminum paint	1213
12.14	Painting with acid proof paint	1214
12.15	Painting with anti-corrosive bitumanistic paint	1215
12.16	Wall painting with plastic emulsion paint	1216
12.17	Varnishing	1217
12.18	Oiling with raw linseed oil	1218
12.19	Wax polishing with readymade wax polish	1219
12.20	Painting cast iron rainwater, soil waste and vent pipes and fittings including priming coat	1220
12.21	Lettering with paint	1221
12.22	French polishing.	1222
16.	STANDARD SPECIFICATIONS FOR MISCELLANEOUS	
16.01	Bamboo chocks with blue Hungary cloth pulleys, rings, ropes, hools, staples etc., complete including painting two coats.	1601
16.02	Teak wood trellis work for verandahs	1602
16.03	Forming black boards on walls	1603
16.04	Barbed wire for fencing	1604
16.05	Reinforced concrete fence posts	1605
16.06	Fencing with barbed wire or chain link mesh	1606
16.07	Protection of building and altered structures against lightning	1607
16.08	Steel doors, windows and ventilators	1608
16.09	Aluminum doors, windows and ventilators	1609
16.10	Fixing and glazing of metal (steel and aluminum) doors and	1610

SPECIFICATIONS

1.0 PREAMBLE

The technical specifications for various items of work contained here shall be read in conjunction with the specifications mentioned for each item of work in bill of quantities part-I (Schedule – A) and also plans and drawings in part III.

2.0 GENERAL TECHNICAL SPECIFICATIONS

- 2.1** The following are the general technical specifications to be adopted for construction of buildings. Each item of work shall be executed according to the relevant standard specification number as described in the “Andhra Pradesh Standard Specification” (APSS) and Indian Standard (I.S) Specifications, including Water supply, Sanitary and Electrical Installations. In the absence of any definite provisions on any particular item of work in the aforesaid specifications in A.P.S.S., reference may be made to the latest codes and specifications of Indian Standards or Indian Roads congress (IRC in case of Roads). Where even these are silent, the construction and completion of works shall conform to sound engineering practice as approved by ED, JETL and in case of dispute arising out of the interpretation of the above, the decision of ED, JETL shall be final and binding on the contractor.

3.0 GENERAL INSTRUCTIONS

3.1 Drawings, Instructions, Measurements

All work shall be done according to the detailed drawings and specifications. Figured dimensions shall be followed. Measurements shall be taken of the actual work done but shall not exceed those marked on the drawings for payments.

3.2 Site Clearance and Demolition

The site shall be cleared of all trees, stumps, roots, brush wood, bushes and other objectionable materials. Useful and saleable material shall be the property of the Owner (A.P.S.F.C.) and shall be stacked properly as directed by the -ED, JETL. The areas to be covered with embankments shall be stripped of topsoil to required depths to expose acceptable founding strata. Topsoil unsuitable for use in embankment construction and other fills shall be disposed off as directed. All combustible materials shall be stacked and burnt in locations sufficiently remote to eliminate all danger of fire hazards. All old concrete, brick works and drains which interfere with construction works shall be dismantled with the approval of the ED, JETL duly taking all necessary precautions prescribed in safety specification. Topsoil which is suitable for use in construction work shall be stockpiled for later use. Other objectionable materials such as trash, debris, stones, brick, broken concrete, scrap metal etc., shall be disposed off as directed by the Engineer. Payment for cutting and removal of trees, stumps,

dismantling existing structures and stripping shall be regulated by the description in the Schedule of Items or Section 2 of A.P.S.S.

3.3 Precision: The works shall be set to the highest precision of dimensions, levels, grades and lines as per designs and drawings using precise scientific equipments and measuring instruments.

3.4 Quality of work:

To be the best quality: All the materials, workmanship, articles, Equipment, tools and plants should be of high and acceptable quality conforming to the standard specifications.

All materials shall be new and of the kinds and qualities described in the contract.

3.5 Testing of works and materials

3.5.1 All materials used and works done shall be subject to approval of the ED, JETL.

3.5.2 The contractor shall arrange sufficiently in advance to test materials and portions of works in order to prove their soundness and efficiency if required, including samples and supporting test results from the approved laboratory and other documentary evidence from the manufacturer, wherever applicable, and indicate the types of materials and their respective sources. The delivery of materials at site shall commence only after the approval of the quality, grading and sources of the materials by the ED, JETL.

3.5.3 The quality of all materials approved shall be maintained throughout the period of construction and periodical tests shall be carried out to ensure that it is maintained. The contractor shall conduct tests at work site/approved laboratories and shall maintain test reports at site for cement, coarse aggregates, fine aggregates, water, steel, bricks and concrete at the following frequency:

S. No.	Description of material	Frequency of test	Allowable limits
1.	CEMENT: (IS : 8112-1989)		
	a) Fineness	One for each source of supply in a month	Shall not be less than 3500 sqcm / gm
	b) Setting time	-do-	Initial setting time shall not be less than 30 minutes and final setting time shall not be more than 60 minutes.
	c) Soundness	-do-	Expansion (unaerated) shall be not more than 10mm by "Le Chatelier" method; if it fails, expansion of aerated sample shall be not more than 5 mm.

S. No.	Description of material	Frequency of test	Allowable limits
	d) Compressive strength of cement mortar cubes 1:3 (1 cement :3 standard sand) by mass	-do-	Compressive strength for 7 days shall not be less than 330 kg/cm ² and compressive strength for 28 days shall not be less than 430 kg/cm ²
2.	Coarse aggregate: (IS383-1970) a) Gradation b) Aggregate impact value	One test for 15 Cum or at least on the day of concrete if concrete quantity is less than 15 cum. Once for each source of supply or whenever change in texture is noticed.	40mm Metal: a) Sieve analysis : -63mm – 100% 40mm-85 to 100% 20mm-0-2-%; 10mm-0.5% b) Flakiness Index: shall be less than 30% by weight 20mm Metal: a) Sieve analysis : -Limits : 40mm – 100%; 20mm-95 to 100%; 10mm-25 to 55%; 4.75-0 to 10% b) Flakiness Index: less than 25% c) Aggregate impact value: 20-40(IS 2386-1963)
3.	FINE AGGREGATE (IS383 –m1970) a) Gradation for concrete	One test for every 15 cum.	Fineness modules: Fine sand limit 2.2 to 2.6
	b) Gradation for masonry	At least once on the day of work	Medium sand limit 2.6 to 2.9
	c) Gradation for finishing	-do-	Coarse sand limit 2.9 to 3.2
	d) Bulkage	Three for each day of work i.e. morning noon and evening	b) Silt Content: shall be less than 4% by weight
	e) Silt content	At least once on the day of work	
4.	WATER: Chemical test	One test for each source	The water quantity shall be as per clause 5.4 of ISI 456-2000. The PH value of water shall not be less than 6.
5.	STEEL: (F2415 (IS1786-1985)) a) 0.2% proof stress	One for each source of supply and once in six months for fresh	4150 kg/cm ² (Minimum)

S. No.	Description of material	Frequency of test	Allowable limits
		supply	
	b) Elongation	-do-	Percentage of elongation 14.5% minimum
	c) Tensile strength	-do-	Ultimate tensile strength 4900 kg/cm ² (Minimum)
6.	BRICKS : (IS:1077-1976) a) Compressive strength	One for each source of supply and once in two months when change in texture is noticed	Shall not be less than 40 Kg/cm ²
	b) Water absorption	-do-	Shall not be greater than 20% by weight
7.	CONCRETE: (IS456:2000) a) Cube strength	Frequency of testing as per clause 15.2 of IS 456-2000 for example 6 cube specimens, 3 each for 7 days & 28 days strength for every 15 cum. Cube shall be prepared, cured and tested in accordance with the requirement of IS 516.	a) Compressive strength (7 days) M15-100 Kg/cm ² (Minimum) M20-135 KG.cm ² (Minimum) b) Compressive strength (28 days) M15-150 Kg/cm ² (Minimum) M20-200 Kg/cm ² (Minimum)
	b) Slump	Thrice in a day of concrete in morning, noon and evening	a) Foundation footing – 10mm to 25mm b) Column beams and slabs – 25mm to 40mm (With normal reinforcement) c) Beams, slabs – 40mm to 50mm (with congested reinforcement)

A Register of record of material testing and Register of daily events showing materials received, labour engaged, out turn of work etc. shall be maintained at site and shall be signed by the contractor or his authorized representative and the Engineer

3.6 Rejection of Materials/works

- 3.6.1** Any material brought to site which in the opinion of the Engineer is defective, sub-standard, damaged, contaminated, deteriorated or does not comply with the requirement of the specification shall be rejected. The contractor shall remove from site such materials within 4 hours of notice from site.
- 3.6.2** If the work or portion of the work which in the opinion of the Engineer is found to be defective or unsound, the contractor shall pull it down and re-execute the same work at his own cost.
- 3.7 Measurement Materials**
For the Controlled Concrete where site mixing is permitted shall be with concrete mixtures fitted with weigh batching scale. Materials shall be weighed and batched in mechanical weigh batchers as per the specified proportions of the approved design mix. Materials requiring Volumetric mixing, wherever permitted, should be measured separately in boxes of appropriate size before being mixed in the specified proportions.
- 3.8 Storage of Materials**
Adequate safe, dry storage shall be provided for all materials particularly cement.
- 3.9 Codes**
- 3.9.1** Unless mentioned otherwise, current versions of all codes, specifications and standards issued by the Indian Standards Institution and Indian Roads Congress shall be fully applicable to these specifications. In the absence of appropriate publications by ISI or IRC, adoptable specification of the International Organization for Standardization shall apply.
- 3.9.2** In case of any conflict in meaning between the specifications mentioned herein and those of ISI or IRC, the provisions of these specifications shall prevail.
- 3.9.3** The following codes shall be applicable for this purpose. However, the latest revision of these codes shall only be used.

**LIST OF SPECIFICATIONS FOR THE VARIOUS ITEMS OF WORKS SUPPLEMENTING THOSE
DESCRIBED IN SCHEDULE 'A' BY S.S. NUMBERS**

GENERAL SPECIFICATIONS

S. No.		Short title/ Description	IS.No. and as amended from time to time
A) LIST OF INDIAN STANDARDS			
I.	CEMENT		
	1	Specifications for 43 Grade ordinary Portland cement	IS 8112:1989
	2	Methods of physical tests for hydraulic comments	IS 4031 (part 1 to 15) :1988
	3	53 Grade cement	IS 12269:1989
II.	AGGREGATES		
	1	Specifications for Coarse and Fine aggregates from Natural resources for concrete	IS 383:1970
	2	Specification for Sand for Masonry	IS 2116:1980
	3	Methods of tests for aggregates for concrete. Part-1 Particle size and shape	IS 2386:1963 (Part I to IV)
		Schedule - B Estimation of deleterious materials & Organic impurities	
		Part-III – Soundness	
	4	Specification for test sieves. Part-I Wire cloth test sieves	IS 460:1978 (Part-I)
III.	BRICKS		
	1	Specifications for Common burnt clay building bricks	IS 1077:1992
	2	Methods of test for burnt clay building bricks	IS 3495:1992 (Part I to IV)
	3	Pulverized Fuel Ash-Lime Bricks - Specification	IS 12894:2002
	4	Specification for concrete masonry units Part 3 Autoclaved cellular Aerated concrete blocks	IS 2185:1984 (Part-III)
IV	BUILDING STONES:		
	1	Method of Tests for determination of strength properties of natural building stones (compressive	IS 1121 (Part –1 to Part 4): 1974

S. No.		Short title/ Description	IS.No. and as amended from time to time
		strength, Transverse strength, Tensile Strength, Shear Strength)	
	2	Schedule of properties and availability of stones for construction purposes	IS 7779:1975 (Part 1 to Part 5)
	3	Quarrying stones for construction purposes, recommended practice	IS 8381:1977
	4	Stone Masonry: Specifications for dressing natural building stones	IS 1129:1972 (Part-IV)
V.	STEEL		
	1	Specification of Mild steel and medium tensile steel bars and hard drawn steel wires for concrete reinforcement. Part-I Mild Steel & Medium tensile steel bars	IS 432:1982 (Part I & II)
	2	Specifications for Cold-worked steel, High strength deformed steel bars and wires for concrete reinforcement.	IS 1786:1985
	3	Specification for steel for General structural purposes	IS 2062:1999
	4	Specification for structural steel (Standard quality)	IS 226:1975
	5	Specification for steel tubes for structural purposes	IS 1161:1998
	6	Hand Drawn Wire	IS 432:1953
VI	CERAMIC TILES		IS 13712:2006
VII	STACKING AND STORAGE OF MATERIALS		
	1	Recommendation of stacking and storage of construction materials and components at site	IS 4082:1996
VIII	MASONRY		
	1	Brick Masonry	IS 2212:1962
	2	Code of practice for construction of Stone Masonry Part-1 (Rubble stone masonry)	IS 1597:1992
	3	Code of practice for permeability test for masonry (during and after construction)	IS 11216:1985
	4	Code of practice for brick work	IS 2212:1991
	5	Construction of hollow and solid concrete block masonry	IS 2572:2005

S. No.		Short title/ Description	IS.No. and as amended from time to time
	6	Code of practice for construction of autoclaved cellular concrete block masonry	IS 6041:1985
IX	CONCRETE		
	1	Code of practice for Plain and reinforced concrete	IS 456:2000
	2	Method of Sampling and analysis of concrete	IS 1199:1959
	3	Method of test for strength of concrete	IS 516:1959
	4	Recommended guidelines for Concrete Mix Design	IS 10262:1982
	5	Code of practice for Ready-Mixed Concrete	IS 4926:2003
	6	Specification for Admixtures for concrete	IS 9103:1999
	7	Guidelines for false work for concrete structures.	IS:14687:1999
	8	Code of practice for use of immersion vibrators for consolidating concrete	IS 3558:1983
	9	Specifications for Pre-cast concrete coping blocks	IS 5751:1984
	10	Laying in situ cement concrete flooring	IS 2571:1970
	11	Code of practice for concrete structures for the storage of liquids	IS 3370:1965 (Part 1 & 2) IS 3370-1967 (Part 3 & 4)
	12	Code of practice for concrete roads	IRC: 15-2002
X	REINFORCEMENT/ STRUCTURAL STEELWORK		
	1	Code of Practice for Bending and fixing of bars for concrete reinforcement	IS 2502:1963
	2	Recommendations for detailing of reinforcement in reinforced cement concrete works	IS 5525:1969
	3	Mils steel wire for General Engineering purposes	IS 280:2006
	4	Recommendation for welding of cold worked bars for Reinforced concrete construction	IS 9417:1989
	5	Code of practice for general construction in steel	IS 800:1984
	6	Code of practice for use of metal arc welding for general construction in mild steel	IS 816:1969
	7	Safety code for erection of structural steel work	IS 7205:1974
	8	Tolerance for fabrication of steel structures	IS 7215:1974
XI.	JOINERY:		
	1	Specifications for timber paneled and glazed door,	IS 1003-Pat 1-

S. No.		Short title/ Description	IS.No. and as amended from time to time
		window and ventilator shutters	2003 and IS1003-Part2-1994
	2	Specifications for cut size timber	IS 1331:1971
	3	Code of practice for Glazing in Buildings	IS 3548:1988
	4	Specification for aluminium doors, windows and ventilators	IS 1948:1961
XII	EARTH WORK:		
	1	Code of Safety for excavation works	IS 3764:1966
	2	Safety code for piling and other deep foundations	IS 5121:1969
	3	Code of practice for earth work on canals	IS 4701:1982
	4	Methods of Test for soils	IS 2720
XIII	OTHER SUBJECTS:		
	1	Code of practice for design and insulation of joints in buildings.	IS 3414:1968
	2	Code of practice for design and construction of foundations in soils: general requirement	IS 1904:1986
		Colours for Ready mixed paints & enamels	IS 5: 2004
XIV.	MACHINERY		
	1	Batch type concrete mixer	IS 1791:1968
	2	Concrete Vibrators – Immersible type	IS 2505:1980
	3	Specifications for moulds for use in tests of cement and concrete	IS 10086:1982
	4	Compression testing machine used for testing of concrete and mortar	IS 14858:2000
	5	Sheep foot roller	IS 4616:1968
XV.	SAFETY		
	1	Code of practice for fire safety of buildings (general): Details of construction	IS 1642:1989
	2	Criteria for earthquake resistant design of structures.	IS 1893:2002 Part-1
	3	Code of practice for earthquake resistant design and construction of buildings.	IS 4326:1993

S. No.		Short title/ Description	IS.No. and as amended from time to time
	4	Safety code for scaffolds and ladders	
		Part-I – Scaffolds	IS 3696:1987 (Part-I)
		Part-I – Ladders	IS 3696:1991 (Part-II)
XVI	DRAWINGS:		
	1	Code of practice for general engineering drawings	IS 696:1972
	2	Code of practice for architectural and building drawings (First revision).	IS 962: 1989
XVII	MEASUREMENT		
	1	Methods of measurement of building and civil engineering works.	IS : 1200

Note:- The above I.S specifications mean latest over and above with amendments if any.

3.10 PERFORMANCE OF WORK

3.10.1 Execution of Works

- 3.10.1.1 All the works shall be executed in strict conformity with the provisions of the contract documents, explanatory detailed drawings and specifications.
- 3.10.1.2 The site should be cleared of all obstructions, vegetation, loose stones and materials before the start of work.
- 3.10.1.3 The ED, JETL. will inspect the work on a Day-to-Day basis.

3.10.2 Work in Monsoon

- 3.10.2.1 The construction may entail working in monsoon also. The contractor must maintain a minimum labour force and execute the construction according to the prescribed schedule.
- 3.10.2.2 Contractor is responsible for keeping the construction work site free from water.

3.10.3 Plinth Levels

A proper level should be maintained, in terms of horizontal and vertical alignment. A minimum acceptable plinth level above road level shall be maintained. The plinth level shall be agreed with the Engineer's representative.

4.0 DETAILED SPECIFICATIONS OF MATERIALS

4.1 Water (APSS No. 129)

Water should be clean, fresh and free from all chemicals, oils, salts and deleterious materials and vegetable growth. Water has to meet the requirements mentioned in Cl. 5.4 of IS:456-2000. Storage for water should be sufficient and adequate for the regular consumption of works and for the use of labour on site.

4.2 Earth (APSS No. 309 & 310)

For filling, the soil shall be free from all rubbish, organic or vegetable growth including roots, weeds etc. Black cotton soil should not be used for basement filling.

4.3 Sand/ fine aggregate (APSS No. 110)

Sand to be used shall be composed of hard siliceous material and shall be clean, sharp, hard, strong and angular type. Sand shall be clean river or pit sand of approved quality and free from salts, earth, dust or other impurities. Sand for plain and reinforced concrete shall confirm to IS: 383-1970. Sand for various purposes shall confirm grading as below.

Sand for Masonry --- table 110-A of APSS No.110

Sand for Plastering --- table 110-B & 110-C of APSS No. 110

Sand for Plain and Zone I to III of table 110-D of APSS No.110

Reinforced concrete

TABLE – II				
4.3 FINE AGGREGATE (SAND)				
Percentage passing by Mass				
L.S. Sieve Designation	Grading Zone - I	Grading Zone – II	Grading Zone - III	Grading Zone - IV
10 mm	100	100	100	100
4.75 mm	90-100	90-100	90-100	95-100
2.36 mm	60-95	75-100	85-100	95-100
1.18 mm	30-70	55-90	75-100	90-100
600.00 microns	15-34	35-59	60-79	80-100
300.00 microns	5-20	8-30	12-40	15-50
150.00 microns	0-10	0-10	0-10	0-15

4.4 Stone for Masonry (APSS No. 107)

4.4.1 Stones used shall be strong, durable, dense, compact, close grained, homogeneous, fire resistant and shall be obtained from sources approved by ED, JETL. Stones shall additionally be hard, sound, free from cracks, decay and other flaws or weathering and shall be easily workable. Stones with round surfaces shall not be made use of.

4.4.2 Stones shall have a crushing strength of not less than 1000 Kg/cm². Stones with lesser crushing strength may be used in works with prior approval of the Engineer. Stones shall be non-porous and when tested in accordance with IS: 1124-“Method of Test for Determination of Water Absorption” etc., shall show water absorption of less than 5% of its dry weight when soaked in water for 24 hours. Tests for durability and

weathering shall be done in accordance with ARE: 1126 and IS: 1125 respectively. The working of stones to required sizes and their dressing shall be as per IS: 1127 "Recommendations for dimensions and workmanship of natural building stones for Masonry work" and IS: 1129 "Dressing of Natural Building Stones". Stones, especially limestones and sand stones, shall be well seasoned by exposure to air before use in construction works.

4.5 Cement (APSS No. 112)

4.5.1 Cement should comply with the requirements of IS:8112-1989 and should be 43 grade ordinary Portland Cement, for making plain and reinforced concrete, mortar etc. The quality of cement shall be in conformity to the performance characteristics given in IS: 8112 - 1989.

4.5.2 The contractor shall procure bulk cement required for the works only from reputed cement factories (main producers) acceptable to the Engineer and should obtain, furnish from suppliers of cement, a test certificate for every consignment of cement. The cement bag shall bear the manufacturer's name or their registered trademark. Cement shall be tested in accordance with IS: 4031-1988 and IS: 4032-1988.

4.5.3 The cement should be delivered to the site in sound dry bags and shall be stored properly. Cement packed in LDPE Bags may be preferred to ensure protection from moisture and dampness.

4.5.4 The contractor has to make his own arrangements for the procurement of cement of required specification for works subject to the following:

- a) The contractor shall procure bulk cement required for the works, only from cement factories (Main producers) of approved make and brand only as approved by the ED, JETL. The contractor shall make own arrangements for adequate storage of cement.
- b) The contractor shall procure cement in standard packing (50 Kg per bag) from the authorized manufacturers. The contractor shall make necessary arrangement at his own cost to the satisfaction of ED, JETL for actual weighment of random sample from the available stock and shall confirm with the specification laid down by the Bureau of Indian standards or other standard institutions as the case may be. Cement shall be got tested for all the tests as directed by the ED, JETL the cement of 60 days requirement at least one month in advance to ensure the quality of cement so brought to site and shall not remove the same without the written permission of the ED, JETL.
- e) The contractor shall forthwith remove from the works area any cement that the ED, JETL may disallow for use on account of failure to meet with required quality and standard. Damaged or reclaimed or partly set cement will not be permitted to be used and shall be removed from the site.
- f) The contractor will have to construct sheds for storing cement having capacity not less than the cement required for 90 days use at appropriate locations at the work site. The ED, JETL or the representatives shall have free access to such stores at all times.
- g) The contractor shall further at all times satisfy the ED, JETL on demand by production of records and books or by submission of returns and other proofs as directed that the

cement is being used as tested and approved by ED, JETL for the purpose and the contractor shall at all times keep his records up to date to enable the ED, JETL to apply such checks as he may desire.

- h) Cement which has been unduly long in storage with the contractor or alternatively has deteriorated due to inadequate storage and thus become unfit for use on the work shall be rejected by the Company and no claims will be entertained. The contractor shall forthwith remove from the work area any cement the ED, JETL may disallow for use on work and replace it by cement complying with the relevant Indian Standards.

4.5.5. STORAGE OF CEMENT

4.5.5.1 Portland cement readily absorbs moisture not only in the form of free water but also moisture from the atmosphere or from damp material in contact with it and becomes hydrated and loses strength. It is necessary therefore that it should be protected from absorption of moisture before it is used if it is to fulfill its function. An absorption of one or two percent of water has not appreciable effect but further amounts of absorption, results in hardening of the cement and reduced the strength. If the absorption exceeds 5% the cement is for all ordinary purposes ruined.

4.5.5.2 American, Spanish and German experiments have shown that on average the strength of cement stress in bags is reduced.

After 3 months by 15 to 20 percent.

After 6 months by 20 to 30 percent.

After 12 months by 30 to 50 percent.

After 2 years by 40 to 50 percent.

These figures prove that special attention should be paid to the storage of cement, even when its strength is equal to or surpasses the specified normal strength.

4.5.5.3 As a general principle the cement must be protected as far as possible from any form of moisture prior to mixing concrete mortar.

4.5.5.4 The cement should be stored in a well constructed dry godown or shed. The cement store should be weather tight construction with a sound wooden or ground to ensure that it is damp proof building. The storage place required for a given quantity of cement can be calculated at the rate of 2.50 sqm for a ton of cement. Cement should not be placed directly on cement plaster flooring and other types of flooring commonly meant with which are not damp proof. A wooden platform or false floor or a sheet of waterproof paper should be provided.

If none of these is possible, then the floor should be covered with straw, hay, cinder or ash or such other material densely and uniformly packed to a thickness of at least one inch and over a laid worth tarpaulin of old cement. Large windows and ventilators, if any should be tightly shut to prevent from circulation of air inside the stores. Drainage

should be provided if necessary to prevent accumulation of water in the vicinity of the store.

- 4.5.5.5 Cement should be stored in piles arranged parallel to the walls. It is not advisable to pile bags against the walls and an allowance of at least 0.3M all round should be made between the exterior walls and piles. At least 0.6M wide should be left for each access and delivery.

When storing the bags, the floor should be raised 30 cms. above the ground and stacked in rows not exceeding 10 bags high. The cement is to be stored in such a manner that easy access and proper inspection and counting is possible.

Successive consignments covered with some waterproof cover as a both measure of protection and prevent the free circulation of air as each lot of proper fresh air will bring in more moisture. Once the cement has been properly stored should not be disturbed until it is to be used. There is no advantage in moving and stacking the bags to reduce where house set as this practice only exposes fresh cement to the air resulting in loss due to the shifting of cement through the cloth mesh and in damage to the stacks.

- 4.5.5.6 Even during dry weather and when the relative humidity of the atmosphere even in nights is low, when there is very little moisture in the air the cement in its stock shall be protected with a tarpaulin cover for the stack. When the atmosphere is damp at any time of day or night, greater care has to be taken of the cement and proper protection provided from the dampness.

- 4.5.5.7 Cement required for use immediately after delivery to the site may be stored in the open on a raised damp proof floor so long as it is fully protected by tarpaulin or weather resisting covers. Storage under these conditions should be limited to 48 hours. The tarpaulin should be raised well above the topmost Ties of bags and must be sloped for rapid drainage in case of showers.

- 4.5.5.8 Consignments should be used in the same sequences as they are delivered. To ensure this the date of arrival of each consignment should be clearly indicated. This is best done by tying a piece of country twines or cord to the end bags in the bottom most tier of the days pile, tacking the two places of card up the sides and along the top of pile and tying the main the center. The date of receipt in the store being clearly written on a bin card high from the card. Dead storage where the cement remains in place for a long time which other consignments of cement come in and out should be avoided.

- 4.5.5.9 In issuing cement from a store, the cement bags should be removed in vertical column of the pile and not horizontal so as to avoid dead stoppage space.

- 4.5.5.10 As a rule, cement should not be stored longer than three months. Cement held in storage for a period of 90 days or longer shall be re-tested. Especially in the rainy season prolonged storage should be avoided. If stock is likely to be held over for more than three months anticipatory measures should be taken to use it on the works.

- 4.5.5.11 Cement that has become hard due to storage in damp positions due to exposure to the weather is generally useless for making concrete and should be removed from the site.

4.6 Bricks (APSS No. 102)

- 4.6.1 Bricks for masonry shall be common burnt clay building bricks having minimum crushing strength of 40 Kg/cm² and shall conform the relevant specifications of IS 1077-1992.
- 4.6.2 They shall be sound, hard and thoroughly well burnt, but not over-burnt, with uniform size having rectangular faces with parallel sides and sharp straight right-angled edges and be of uniform colour with fine compact uniform texture. Bricks shall be of uniform deep red cherry or copper colour. They shall be free from flaws, cracks and nodules of free lime.
- 4.6.3 Water absorption after 24 hours immersion in cold water shall be not more than 20% by weight. They shall not absorb more than 10% of the weight of water after immersion for six hours.
- 4.6.4 They shall emit a clear metallic ringing sound when struck by a mallet and shall not break when dropped on their face, from a height of 60 cm.
- 4.6.5 Fractured surface shall show homogeneous, fine grained uniform texture, free from cracks, air holes, laminations, grits, lumps of lime, efflorescence or any other defect which may impair their strength, durability, appearance and usefulness for the purpose intended. Under-burnt or vitrified bricks shall not be used.
- 4.6.6 Samples of bricks brought to the site shall be tested periodically for compression and other tests according to IS: 3495, Parts-I, II & III - "Method of Test for Burnt Clay Building Bricks".

4.7 Coarse Aggregate (APSS No. 108)

The coarse aggregate shall be from hard granite crushed stone conforming to IS 383 :1970. The pieces of aggregate shall be nonporous, hard, strong durable clean and free from clay, rounded in shape and shall have granular or crystalline non powdery surfaces. The aggregate shall be well graded. Tests where required shall be carried out in accordance with IS : 2386 - 1963.

I.S. 383 / 1970 Table – I						
4.7.1 Coarse Aggregate						
I.S. Sieve designation	Percent passing for single-seized aggregate of metal size			Percentage passing for graded-aggregate of nominal size		
mm	40 mm	20 mm	12.50 mm	10 mm	40 mm	20 mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)
80 mm	---	---	---	---	100	---
63 mm	100	---	---	---	---	---

40 mm	85-100	100	---	---	95-100	100
20 mm	0-20	85 - 100	---	---	30-70	95-100
16 mm	---	---	100	---	---	---
12.50 mm	---	---	85 - 100	100	---	---
10 mm	0-5	0-20	0-45	85 - 100	10-35	25-55
4.75 mm	---	0-5	0-10	0-20	0-5	0-10
2.36 mm	---	---	---	0-5	---	---

L.S. Sieve Designation	40mm Nominal	20mm Nominal
80.00 mm	100	---
40.00 mm	95-100	100
20.00 mm	45-75	95-100
4.75 mm	25-45	30-50
600.00 microns	8-30	10-35
150.00 microns	0-6	0-6

4.8 Steel Reinforcement (APSS No. 126)

STEEL

- 4.8.1 Mild steel bars shall conform to Grade I of IS: 432.
- 4.8.2 High yield steel strength deformed bars shall conform to IS:1786-1985. The binding wire shall conform to IS:280. The various types of steel shall conform to the relevant IS specification as provided in A.P.S.S. No.126.
- 4.8.3 The contractor has to make his own arrangements for procurement of tested steel required for the work. He shall also make his own arrangements for transportation and storage.
- 4.8.4 The contractor shall procure steel from TATA, SAIL, VSP & JSW Steel. They shall not be permitted to use steel bought from other manufactures.
- 4.8.5 The contractor should invariably obtain necessary ISI test certificates from the suppliers of steel for each and every consignment and furnish them to the ED, JETL,

before use on works. Test certificates conforming to IS 1786-1985 are to be furnished. The HYSD steel (IS 1786-1985) bars should have a TOR mark.

The original bills of procurement should be submitted to the ED, JETL for making payment of the item. The contractor shall purchase the steel in the name of the work, number and the name of the contractor and furnish the same to the ED, JETL. The steel without the above two names will not be accepted on the works. Vendors test certificates and weighment bills are to be furnished to the ED, JETL and any quantity purchased without test certificates will not be accepted for use on the works.

4.8.6 If any difference is observed on carriage inwards, carriage outwards and theoretical requirement of steel for finished work, the contract will be cancelled, and the contractor will be blacklisted.

4.8.7 The diameter and weight of steel should be as per IS 1786-1985 or relevant IS specification with subsequent revisions from time to time:

S. No.	Diameter of rod	Sectional weight in Kg/ RM both for Plain and HYSD steel
1	6 MM	0.22
2	8 MM	0.39
3	10 MM	0.62
4	12MM	0.89
5	14 MM	1.21
6	16 MM	1.58
7	18 MM	2.00
8	20 MM	2.47
9	22 MM	2.98
10	25 MM	3.85
11	28 MM	4.83
12	32 MM	6.31
13	33 MM	6.71
14	36 MM	7.99
15	40 MM	9.86
16	42 MM	10.88

Note: If any rods other than those diameters specified above are procured the weights shall be as per standard steel tables.

4.8.8. Quality control: The contractor shall furnish the samples for testing for each batch and consignment along with the test certificates issued by the vendors to the ED, JETL immediately after receipt of the steel in the stockyard at site of work for verification and testing.

No steel procured by the contractor shall be used in any work until the ED, JETL has given notice that the test results are satisfactory.

4.8.9. STEEL STORAGE:

- a) Reinforcement steel and binding wire shall be stored above ground surface upon platform, skids or other supports protected as far as possible from surface deterioration by direct contact with undesirable elements or by exposure to conditions producing rust and corrosion. Bars shall be so supported as to avoid distortion and sagging of long lengths. All the reinforcement of same designation shall be stacked separately and distinctly marked.
- b) Steel shall be stacked and stored in accordance with IS 4082: 1996 as per Recommendations on stacking and storage of construction materials.
- c) If the reinforcing rods have to be stored for a long duration, they shall be coated with cement wash before stacking and/or be kept under cover.

4.8.10 Reinforcement shall be free from pitting due to corrosion and free from loose rust, dirt, dust, mill scale, paint, oil, grease, adhering earth etc.

4.8.11 Erected and secured reinforcement after fabrication shall be inspected and approved by the JETL prior to placement of concrete.

4.9.1 TEAK WOOD FOR JOINERY/ DOORS

The wood shall be well seasoned, uniformly coloured and shall be free from knots, cracks, shakes, splits, cross grains etc.

The wood shall be durable and of reasonably straight grains.

Moisture content of wood used shall be as near as possible to the following values:

Recommended values of moisture content in timber at the time of assembly or framing:

Type of work	Coastal area	Inland area
Frames for doors and windows	16 to 18%	14 to 15%
Shutters of doors and windows etc	15 to 16%	12 to 14%

4.9.2 GLAZED TILES (APSS No. 121)

The tiles shall be covered by a glaze on the top and under side. The edges shall be free from glaze in order that the tiles may adhere properly to the base. The glaze shall be uniform in quality and free from welts, chips, craze, specks, crawlings, or other imperfections visible from a distance of one meter. The glazed tiles shall be white or color and size of 300mm x 200 mm with a thickness of 7mm. The tiles shall be true to shape and conform to the performance requirements of IS 13712:2006 and supplier shall submit a certificate with respect to the quality of tiles and detailed there in.

5.0 DETAILED SPECIFICATION OF WORKS

5.1 Standard

A high standard of workmanship in all trades will be required. The Contractor shall ensure that only skilled and experienced workmen are employed.

5.2 Supervision

The Contractor's supervising staff shall be fully qualified and experienced in the types of work being carried out under the supervision and shall be capable of ensuring that they are done well and efficiently.

5.3 Temporary works

Where required, the Contractor shall furnish such details of his temporary works as may be called for by the ED, JETL and the Contractor shall satisfy the ED, JETL as to their safety and efficiency. The ED, JETL may direct that temporary works, which he considers unsafe or insufficient, shall be removed and replaced in a satisfactory manner.

5.4 Codes

5.4.1 Unless mentioned otherwise, current versions of all codes, specifications and standards issued by the Indian Standards Institution and Indian Roads Congress, wherever mentioned, shall be fully applicable to these specifications. Where standards are not yet published by the ISI or IRC, adaptable British Standards or Specifications of the International Organization for standardization shall apply.

5.4.2 In case of any conflict in meaning between the specifications mentioned herein and those of ISI or IRC, the provisions of these specifications shall prevail.

5.5 Base lines and benchmarks

The Contractor shall establish and maintain, to the satisfaction of ED, JETL, the base lines and benchmarks, based on which the works are set out. Where such base lines and benchmarks are provided by the ED, JETL, the Contractor shall maintain these throughout the period of construction without causing any disturbance to them.

5.6 Setting out.

The Contractor shall set out all the works to be executed by him, in line with the standard base lines, position and benchmarks and truly as per drawings within the accepted tolerance limits at no extra cost to Owner. The Contractor shall be solely responsible for the correct setting out of all the works, to be executed by him and the approval of such setting out by the Engineer shall in no way absolve the Contractor of his responsibility for carrying the work to the true lines, levels and positions as per drawings.

5.7 Dewatering

The Contractor shall carry out all the works, in dry and workable condition and maintain the same in dry condition till the final handing over of works at no extra cost to the Owner. For this the Contractor shall make at his cost all the necessary provisions of dewatering, wherever necessary, to the full satisfaction of the ED, JETL.

5.8 Safety of existing work

Before taking up any construction adjoining other property or existing work, the Contractor shall take all steps necessary for the safety and protection of such property or work.

5.9 Protection of existing services

The Contractor shall take all precautions necessary to prevent damage to or interference with under-ground or over-ground services such as cables, drains, piping or piles, whether shown in drawings or not. Equipment etc., mounted in position shall be protected against falling debris etc., by means of tarpaulin or such other material.

5.10 Handing over of work site.

On completion of work, the Contractor shall remove all rubbish, debris, surplus materials, temporary work etc., from the site. The site shall be handed over in a tidy and workmanlike manner.

5.11 CRS Masonry in CM (1:8) in 1st sort (APSS 107 & APSS 611)

5.11.1 The work shall consist of a facing of selected stones hammer dressed at faces and joints with only a small proportion of smaller stones in the hearting.

5.11.2 The face stones shall be set in regular courses of uniform thickness from bottom to the top throughout. The height of the course should be uniform throughout by using stones of same height. The face stones shall be laid in headers and stretchers alternately so as to break joint by at least 75mm and headers shall project at least 100mm beyond stretchers. The stones shall be solidly bedded, set full in mortar with joints not exceeding 12mm in thickness and shall extend well back into the hearting.

5.11.3 Bond stones shall be placed in the wall @ interval of 2m in length and 600mm in height and shall run through the wall if the wall is not more than 600mm thick. If the wall is more than 600mm thick line of headers shall be laid from face to back each header overlapping the other by at least 150mm.

5.11.4 The heart portion shall be filled with good flat bedded stones set as close as possible, well set in mortar.

5.11.5 The work on the interior face shall be precisely the same as on the exterior face unless the work is to be plastered in which case the side joints need not be vertical.

5.12 Coursed Rubble Masonry in CM (1:8) 2nd sort: (APSS NO. 612)

This work shall be executed similar to the specifications for C.R.S. masonry 1st sort with the exception that the hearting and backing shall conform to the standard

specification for random rubble masonry and bond with the face stones being carried up continuously with the face work.

5.13 RRS Masonry in CM (1:8) (APSS 107 & APSS 615)

5.13.1 The face stone is hammered dressed on the face, side and the beds to enable to come into close proximity with the neighboring stone. Face stone shall be of not less width in plan than 150mm for walls of 400mm thick, 200mm for walls of 450mm thick. The face stone shall be laid in headers and stretchers alternatively so as to break joints by at least 75mm. Care is to be taken to break joints vertically.

5.13.2 Bond stones should be built in the wall at intervals of 2m in length and 600mm in height and shall run through the wall if the wall is not more than 600mm thick. The heart portion shall be filled with good flat bedded stone set as close as possible, well set in mortar.

5.14 Brick Work: (APSS 102 APSS 501 & 504)

5.14.1 All bricks to be used in the work shall be thoroughly soaked in water before use to prevent absorption of water from the mortar.

5.14.2 The bricks shall be set in cement mortar of **1:8** proportions by adopting a proper bond (preferably either English bond or a Flemish bond) throughout the wall.

5.14.3 The walls shall be taken up truly plumb. All courses shall be truly horizontal (level) and truly vertical. Vertical joints of consecutive courses shall not come directly over one another. Vertical joints, in alternate course shall come directly over one another. Joint's shall be fully filled with mortar and raked. Every brick shall be laid with full joints of cement mortar on its bed, ends and side in one operation. No feeding of mortar by using excess water shall be allowed.

5.15 Reinforced Half Brick Partition Walls (APSS 102, 501, 504, 509)

5.15.1 All bricks to be used in the work shall be thoroughly soaked in water before use to prevent absorption of water from the mortar.

5.15.2 The cement mortar used for reinforced brick work shall be in cm (1:4) and mortar used shall conform APSS No. 113. Reinforcement for half brick walls shall be in the form of MS Bars and shall be of specified qualities. The brick shall be constructed only in stretcher bond. The reinforcement shall be well embedded in cement mortar at every third course and half the joint thickness of mortar shall first be laid and the other half laid after the reinforcement is placed in the position. The free ends of the reinforcement wherever possible shall be pegged into the mortar joints of main brick walls.

5.16 NOTES ON MASONRY

- 5.16.1
- i) All stones, bricks etc., used in the masonry work shall be thoroughly soaked in water before use to prevent absorption of water from the mortar.
 - ii) Stones shall be laid on their broadest faces which give better opportunity to fill the faces between stones.
 - iii) To give sufficient lateral bond a stone in any course shall overlap the stone in the course below i.e. joints parallel to the pressure in two adjoining courses shall not lie too closely in the same vertical line. A minimum overlap of 6" shall be maintained.
 - iv) To give sufficient transverse bond, prescribed no. of headers shall be used.
 - v) The practice of building two thin faces, tying width occasionally through stones and filling up the middle with small stones or dry packing shall be strictly guarded against.
 - vi) Jambs for door and window opening shall be formed with quoins of the full height of the course. The quoins shall be of breadth at least one and a half times the depth for the course and in length at least twice the depth.
 - vii) It is advisable to erect the door and window frames first and build the masonry around.
 - viii) Thickness of the joint should not be more than 12mm.
 - ix) Every course of the masonry shall be truly vertical. Use of plumb bob to check verticality by the mason shall be encouraged.
 - x) Care should be taken to keep all corners and sides including door and window opening truly vertical.

5.16.2 Theoretical requirement of cement should be as follows: -

Cement bags of 50 kgs.

- | | |
|---------------------------------|-------------------|
| a. C.R.S. Masonry in C.M. (1:6) | 1.54 bags per Cum |
| b. C.R.S. Masonry in C.M. (1:8) | 1.15 bags per Cum |
| c. Brick Masonry in C.M. (1:4) | 1.44 bags per Cum |
| d. Brick Masonry in C.M. (1:6) | 0.96 bags per Cum |
| e. Brick Masonry in C.M. (1:8) | 0.72 bags per Cum |

5.17 Plain and Reinforced cement concrete (A.P.S.S. 402 & 403)

- 5.17.1 All R.C.C. work shall be carried out in strict accordance with the latest IS specification. No concrete work shall be cast in the absence of the works-in-charge/Engineer. All the materials used should be of good quality as mentioned in **Sec. 4.0** above.
- 5.17.2 Cast-in-place concrete for the structures shall conform to the requirements of the section. The structures shall be built to the lines, grades and dimensions as per the designs and drawings.

5.18 Controlled concrete: Controlled concrete shall be used on all concrete works. Reinforced cement concrete shall correspond to **M20** grade as per **IS 456-2000** equivalent to (1:1.5:3) nominal mix proportion.

For all major concrete pours like RCC slabs, roofs, beams etc Ready Mix Concrete of specified grade from approved suppliers shall be used.

5.19 Mix Proportions & Strength requirement of concrete: The proportions of various ingredients to be used in the concrete for different parts of the work shall be established by proper mix through design mix. The contractor shall produce concrete mix design and establish the strength of concrete with this concrete mix design for 3 days, 7 days and 21 days as per IS 456-2000. For controlled concrete, the mix design shall be so designed as to attain in preliminary tests a strength at least 33 percent higher than that required on work tests. The design mix shall be got approved by the ED, JETL before proceeding with the concreting. The contractor is required to carry out the mix design and the design mix shall be got approved by the ED, JETL, APSFC within the limitations of parameters and other stipulations laid down in IS-456/2000.

The specified characteristic compressive strength of 150 mm size cube at 28 days attained for M20, M25 and M30 grades of concrete shall be 20 N/sqmm, 25N/sqmm and 30 N/sqmm respectively. The mix shall be designed to produce the grade of concrete having the required workability and a characteristic strength at 28 days not less than the appropriate values mentioned in Table-2 of IS-456:2000 The target mean strength of the concrete mix should be equal to the characteristic strength plus 1.65 times the standard deviation.

TABLE
MINIMUM COMPRESSIVE STRENGTH OF 15 CM. CUBES
AT 7 AND 28 DAYS AFTER MIXING, CONDUCTED
IN ACCORDANCE WITH IS.516

Class	Preliminary test N/mm ²		Works test N/mm ²		Maximum size of aggregate mm
	at 7 days	at 28 days	at 7 days	at 28 days	
M40	33.50	50.00	27.00	40.00	20
M35	30.00	44.00	23.50	35.00	20
M30	25.00	38.00	20.00	30.00	40 or 20
M25	22.00	32.00	17.00	25.00	40 or 20
M20	17.50	26.00	13.50	20.00	40 or 20
M15	13.50	20.00	10.00	15.00	40 or 20

Whenever the grade of concrete such as M30 etc., is specified it shall be Contractor's responsibility to ensure the minimum crushing strength stipulated for the respective grade of concrete is obtained at works.

In the case of M30 grade concrete minimum cement content of 340Kgs/ Cum shall be used to obtain a minimum cube strength of 30N/ mm² at 28 days age.

The contractor shall maintain the test results on a regular basis as indicated in I.S.456/2000 and subsequent amendments thereon.

In all cases, the 28 days compressive strength specified shall be the criterion for acceptance or rejection of the concrete.

The sample of water taken for testing shall be typical of the water proposed to be used for concreting.

The contractor shall be responsible for production of controlled concrete as per design mix to ensure the required works cube strength is attained and maintained. In the designation of concrete mix, letter 'M' refers to the Mix and the number to the specified 28 days works cube compressive strength in Newton per sq.mm.

The concrete where site mixing is permitted shall be with concrete mixtures fitted with weigh batching scale. All measuring equipment shall be maintained in a clean serviceable condition and their accuracy periodically checked.

5.19.1 The proportions of cement concrete, if specified in volumetric proportions i.e., nominal mixes shall be as follows which are indication of approximate proportion of cement, fine aggregate and coarse aggregate which may have to be altered suitably at site to obtain desired strength and workability. However, the quantity of cement shall not be less than specified below.

<u>Nominal Mix</u>	<u>Cement in bags of 50 kgs / 1Cum (net) of cement concrete</u>
a) 1:3:6	4.42 bags of 50 Kgs
b) 1:4:8	3.31 bags of 50 Kgs
c) 1:5:10	2.65 bags of 50 Kgs

As per sanctioned estimate the design mix are proposed for all RCC members with the following design mix mentioned in Bill of Quantities towards the cement quantity required for attaining such design which is specified below.

<u>Design Mix</u>	<u>Cement in Kgs</u>
a) M20	330 Kgs
b) M25	380 Kgs

The contractor shall ensure the tests of Design Mix from the Reputed Agencies / University or any Research Lab for ensuring the strength of Design Mix with the provided quantity of cement in the estimate. Any plus or minus will be allowed in payments.

- 5.19.2 The quantity of water shall be varied to suit the moisture content of the aggregate and shall be just sufficient in produce a dense concrete with workability. Workability should be checked at frequent intervals as per **IS: 1199**. An accurate and strict control shall be kept on the quantity of mixing water.

5.20 Concrete quality control measures and concrete quality Assurance Test Programme

- a) Concrete quality control measures: The contractor shall be responsible for providing quality concrete to ensure compliance of the bid requirements.
- b) Concrete quality Assurance Programme: The concrete samples will be taken by the Company and its quality will be tested in any other recognized laboratory per the relevant Indian Standard Specifications IS 516:1959 and LS. 1199-1959.

Samples shall be drawn on each day for each type of concrete.

Tests: The Company will obtain samples and conduct tests as specified in B.I.S. 456- 2000, I.S. 1199- 1959 and I.S. 416 - 1959.

Test Facilities: The contractor shall furnish free of cost samples of all ingredients of concrete for testing and obtain approval from the ED, JETL. He should also supply, free of cost, the samples of all the ingredients of concrete for conducting the required tests.

Test results: The ED, JETL will pass the concrete if average strength of the specimens tested is not less than the strength specified. Concrete not meeting requirements of specification in all respects may be rejected by the ED, JETL in which case it shall be removed and reconstructed entirely at the expense of the contractor.

5.21 Preparation for placing: No concrete shall be placed until preparation of surface involved, all form work, reinforcement, installation of items to be embedded have been approved by the ED, JETL.

- 5.21.1 All surfaces, forms, embedded material shall be free from dried mortar, dirt, foreign substances, waste papers etc. Temporary openings shall be provided to facilitate inspection, especially of bottoms of columns and wall forms, to permit removal of sawdust, wood shavings, binding wire, dirt etc. Such openings/holes shall be suitably plugged later.
- 5.21.2 Foundation surface: Rock surfaces shall be free from oil, objectionable coatings, loose, semi- detached and unsound fragments. Immediately prior to placement of concrete, surfaces of rock shall be washed with an air water jet and shall be brought to a uniform surface dry condition.
- 5.21.3 Concrete shall not be placed in standing water or on a water-covered surface. Any

concrete that has been washed away by heavy rains shall be entirely removed, if there is any sign of cement and sand having been washed away from the concrete mixture.

5.21.4 Starters: Before proceeding with erection of form work for RCC columns, Starters shall be cast with 25 mm thick concrete with string lines placed in position as per the layout.

5.21.5 Slots, openings, holes, pockets etc shall be provided in the concrete work in the positions specified or required or as directed by ED, JETL.

5.21.6 Reinforcement and other items to be cast in concrete shall have clean surfaces that will not impair bond.

5.21.7 Approval by the ED, JETL of any materials and work as required herein shall not relieve the contractor of his obligation to produce finished concrete in accordance with the requirements of the specifications.

5.22 Placing of Concrete: The contractor shall notify the Engineer-in-charge / ED, JETL before batching begins. Batching, mixing and placing of concrete shall be performed only in the presence of an authorized representative of the JETL.

5.23 Weather: Concrete shall not be placed in rain sufficiently heavy or prolonged to wash mortar from concrete. The contractor is not entitled for any additional payment over the unit prices bid in the schedule for concrete, by reason of any limitation in placing of concrete under the above paragraphs.

5.24 Mixing: All cement concrete shall be machine mixed and machine vibrated.

5.24.1 The mixer machines should comply with IS 1971-1968 (IS specifications for batch type concrete mixers).

5.24.2 The mixers with other accessories shall be kept in first class working condition and so maintained throughout the construction.

5.24.3 Any mixer that at any time produces unsatisfactory mix shall not be used until repaired. If repair attempts are not successful, the defective mixer shall be replaced.

5.24.4 The Cement and aggregates shall be mixed thoroughly in the specified proportion in a mechanical mixer until the mixture is of uniform colour. Where machine mixing is done the concrete shall be mixed, until the mixture is of uniform colour and, in no case, for less than two minutes.

5.25 Transportation, placing and compaction of concrete:

5.25.1 Equipment & methods: Equipment for conveying concrete shall be of such size and design as to ensure a practically continuous flow of concrete during depositing without segregation of materials. The entire placing programme consisting of equipment, layout, proposed procedures and methods shall be submitted to the ED, JETL for approval

- 5.25.2 After mixing, the concrete shall be transported from the mixer to the position of placing as rapidly as possible by appropriate mean without causing separation or segregation of concrete, maintaining the required workability.
- 5.25.3 Concrete shall only be placed after the ED, JETL has inspected the shuttering and reinforcement. The concrete shall be placed and compacted before initial setting of concrete commences and should not be subsequently disturbed.
- 5.25.4 The concrete shall be deposited as nearly as practicable directly in its final position and shall not be rehandled in a manner which will cause segregation, loss of materials, displacement of reinforcement, shuttering or embedded inserts, or impair its strength. Concrete shall be placed in the shuttering by approved implements and shall not be dropped into place from a height exceeding 1 meter or handled in a manner which will cause segregation.
- 5.25.5 Concrete shall be deposited in successive horizontal layers to a compacted depth of not more than 0.45 meters. These shall be placed as rapidly practicable to prevent the formation of cold joints or planes of weakness between each succeeding layer within the pour.
- 5.25.6 When concrete is conveyed by chutes, the plant shall be of such size and design as to ensure practically continuous flow. Slope of the chute shall be so adjusted that the concrete flows without the use of any excessive quantity of water and without segregation of its ingredients. The delivery end of the chute shall be as close as possible to the point of deposit. The chute shall be thoroughly flushed with water before and after each working period and the water used for this purpose shall be discharged outside the form work.
- 5.26 Compaction:** All concrete shall be compacted to produce a dense homogeneous mass. Concrete after depositing should be compacted thoroughly by means of a mechanical vibration. Vibrators shall conform to IS specifications. Vibrators of the surface, form or Immersion type shall be used, and the concrete shall be thoroughly worked out around the reinforcement, around embedded fixtures and into corners of form work. The hardened concrete shall be free from voids or cavities. Over vibration and under vibration of concrete are harmful and should be avoided. Use of polythene sheet is recommended above the shuttering to arrest the slurry loss through the shuttering joints while placing and compacting the concrete.
- 5.26.1 Vibrators shall be operated by experienced men. Immersion vibrators shall be inserted vertically at points not more than 45 cms apart. Immersion vibrators shall be withdrawn slowly. Blending and melding of the concrete between successive layers shall be ensured. Vibrations shall not be applied through reinforcement and where vibrators of the immersion type are used, contact with reinforcement and all inserts shall be avoided.

5.26.2 Prior to beginning concrete placement, the contractor shall make ready sufficient number of properly operating vibrators & operators and shall have readily available additional vibrators to replace defective ones during the progress of concrete placement.

5.27 Finishing: When the structure is in service all the surfaces shall receive no special finish except removal of fine and abrupt irregularities and clean up of loose debris. Unless varied by the Engineer-in-charge, the type of finish for formed concrete shall be as follows. The concrete surfaces shall be consolidated, smooth screeded, and leveled to produce even surfaces. Floating shall be done only after the screeded surface has attained stiffness to permit finishing operations. The surface shall be uniform in texture and free from screed marks or other imperfections.

5.27.1 Concreting shall be carried out continuously up to construction joints already planned. Joint shall be kept where shear force is minimum. The work shall be resumed at the earliest by scrubbing the wet surface with wire brush and coating the surface with neat cement slurry. The prepared surface shall be approved by the ED, JETL. Special care shall be taken to obtain thorough compaction and to avoid segregation of the concrete along the joint plane.

5.28 Protection of works: The contractor shall protect all concrete against damage until final acceptance by ED, JETL. The fresh concrete shall be protected from defacements and damage due to construction operations, rain, sun and winds. The contractor shall provide protection to prevent erosion to fresh concrete whenever precipitation either periodic or sustaining is imminent or occurring. All fresh concrete surfaces shall be protected from contamination and from foot traffic until the concrete has hardened.

5.29 Replacement of unsatisfactory concrete: Immediately after the shuttering is removed, the surface of the concrete shall be very carefully gone over and all defective areas called to the attention of ED, JETL. If reinforcement is exposed or the honey combing occurs the work may be rejected. Rejected concrete shall be removed and replaced by the contractor. Superficial honey combed surfaces and rough patches if permitted by the ED, JETL shall be made good and finished neatly as per specifications and as directed.

5.30 Curing of concrete: Rigid supervision shall be maintained for curing the concrete after laying for complete hydration and hardening to take place. The set concrete shall be cured by ponding with clean water. All exposed faces of concrete shall be kept continuously moist for a minimum period of 28 days by spraying water or by covering them with gunny bags which shall be constantly sprinkled with water. The curing operation should be done by using stirrup pump, or by any other methods given code IS 456-1984. For curing floors, flat roofs, concrete pavements and other level surfaces the ponding method of curing shall be adopted.

5.31 CENTERING (FORM WORK) AND SHUTTERING

- 5.31.1 **Steel Formwork:** Only steel forms of approved make (Acrow steel centering) shall be used. Forms with surface dents, bulges, undulations or holes shall not be used on the work and shall be removed from the site.
- 5.31.2 Form work shall be substantially and rigidly constructed of steel and shall be true to the dimensions described. Form work shall be constructed to confine and shape the concrete to the required shape, lines and dimensions described. Liners and cores shall be provided where necessary and shall be due to space and securely fixed.
- 5.31.3 Shuttering shall be erected true to line and securely braced, cross braced, struttred and supported to prevent deformation under the weight of pressured wet concrete and constructional loads, wind pressure and other forces.
- 5.31.4 The surfaces of the forms shall be clean and free encrustation of mortar, grout or other foreign materials.
- 5.31.5 The variation in thickness of RCC roof slab due to varying spans or special covering materials should not affect the general roof bed which should be uniform, unless otherwise shown in drawing or as instructed.
- 5.31.6 All joints shall be sufficiently tight to prevent leakage of cement slurry. All faulty joints shall be adequately caulked.
- 5.32.1 **Mould Oil:** Before laying the reinforcement, all faces of shuttering and moulds in contact with wet concrete shall be treated with a coat of oil to prevent adherence to concrete. Release agent should be applied so as to provide thin uniform to the forms without coating the reinforcement.
- 5.32.2 The mould oil (The de-bonding agent) to be applied shall be standard shuttering oil, engine oil or filtered waste oil (Carbon particles and impurities should not be present).
- 5.32.3 Plumb and string lines in sufficient numbers shall be installed before and maintained during concrete placement. During concrete placement the contractor shall continuously monitor plumb, string line and form positions.
- 5.32.4 In the case of columns, retaining walls and vertical structural components suitable arrangement shall be made for securing the form to the already poured concrete.
- 5.33 **Reinforcement for RCC works:**
- 5.33.1 Unless shown otherwise in the drawings, the reinforcement to be used shall be of High Yield Strength Deformed (H.Y.S.D.) bars of grade Fe-415 conforming to IS 1786-1985.
- 5.33.2 The reinforcement shall be steel and shall be free from corrosion, oil, grease, paint or dirt at the time of fixing in position and subsequent concreting.

- 5.33.3 Reinforcing steel bars shall conform accurately to the sizes, dimensions and shapes given as per designs and drawings. Bars shall be bent cold to the specified shape and dimensions and the bars shall be hooked or bent accurately and placed in exact position as per designs and drawings. Bars having kinks or bends other than those required by design shall not be used.
- 5.33.4 Bars of full length shall be used. Reinforcement shall be lap jointed or spliced only if unavoidable. The overlaps shall be staggered for different bars and located at points, along the span where neither shear nor bending moment is maximum. Not more than 33% of the bars specified in drawing shall be lapped at one section.
- 5.33.5 The reinforcement shall be securely held in position and bound together tight by annealed binding wire, and by using stays, blocks or metal chairs, spacers, metal hangers, supporting wires or other approved devices at sufficiently close intervals.
- 5.33.6 Bars shall not be allowed to sag between supports. Layers of bars shall be separated by spacer bars, pre-cast blocks or other approved devices. Binders, stirrups, links should be securely wired to the main ring.
- 5.34.1 **Binding Wire:** Wire for binding reinforcement shall be soft and annealed mild steel of 16 SWG and shall conform to IS: 280-2006. Binding wire shall have tensile strength of not less than 5600 Kg/Cm² and a yield point of less than 3850 Kg/Cm².
- 5.34.2 Proper cover shall be maintained between the reinforcement and the shuttering as per approved drawings and IS codes.
- 5.34.3 The contractor shall ensure that the bars are not displaced during concreting or any other operation over the work. The contractor shall also ensure that there is no disturbance caused to the reinforcing bars in concrete that has already been placed.
- 5.35** All bars protruding from concrete and to which other bars are to be spliced and which are likely to be exposed for an indefinite period shall be protected by a thick coat of neat cement grout.

5.36 Measurement and payment

a. Measurement:

Measurement for payment for the reinforcing bars will be made only on the calculated weight of the bars placed in concrete, in accordance with the drawings or as directed by the engineer. The calculated weight for reinforcing bars shall be determined as follows:

- i. Reinforcement shall be measured in length separately for different diameters as actually used in the work including the lengths of hooks at ends, spacer bars; reinforcement chairs and overlaps to the extent permitted by ED, JETL.
- ii. From the length measured, weight of reinforcing bars shall be calculated on the basis of weights specified in the table in this section.
- iii. Wastage and annealed steel wire for binding shall not be measured as the cost of these items was already included in the unit rate for reinforcement.

Payment rate

The unit rate in the bill of quantities for reinforcement is inclusive of the cost of all wastage of steel and the cost of binding wire or welding materials at site of work, cover blocks and cost of all incidental and operational charges in cutting, bending, cleaning, placing, binding or welding and fixing in position as shown on the drawings and as necessary to complete the work as per specification.

5.37. Cover Blocks

- a) Before concreting, cover blocks shall be fixed in all R.C.C works to separate the reinforcement from the shuttering so that when the concrete is set the reinforcement is well within the concrete section at a distance from the outer surface, with specified cover to reinforcement.
- b) Use of stone chips as cover for the reinforcement will not be accepted. Only cement mortar cover blocks of required thickness to maintain the specified cover shall be used.
- c) Normally a bottom cover of 12mm to 15mm is sufficient for slabs. For columns the cover should be about 40mm, and for beams it is 25mm.
- d) Cover blocks shall be reasonably good for using in appropriate grade of R.C.C. work. The mortar for preparing cover blocks shall at least be of proportion 1:2. Cover blocks shall be prepared on a clean and level platform by spreading the mortar in the moulds of required size and depth. When the mortar is still green strands of tying wire shall be inserted into each block. This wire is useful for tying the block to the reinforcement. After 24 hours the blocks shall be removed from the mould and cured for about seven days.
- e) A properly made cover block does not get crushed when the reinforcement is tied over it and during the concrete work.

5.38

Reinforcement chairs

- a) When the reinforcement is tied there is a need to separate bottom steel from the top steel and to maintain correct effective depth.
- b) For ensuring separation of top and bottom steel and to ensure that the reinforcement work does not get disturbed due to the load or movement of workers when concrete is being laid, reinforcement spacers or chairs shall be fixed.
- c) Use of large sized stones or bricks to separate top and bottom steel will not be allowed.

- d) Reinforcement chairs shall be of slightly lesser size so as to accommodate the chair underneath the top steel and after allowing for the required covers to the top and bottom steel.
- e) The chair shall be minimum 450mm long and should have legs bent in opposite directions to ensure stability,
- f) The chairs shall be placed on a cover block so that the legs do not stick out once the shuttering is removed.

5.39 Removal of Form work: Centering and shuttering shall be removed after maturity gradually without jerking. Before removal of the shuttering the concrete shall be examined properly. Form shall not be released until the concrete has achieved strength of at least twice the stress to which the concrete may be subjected at time of removal of form work. The strength referred to shall be that of concrete using the same cement and aggregates, with the same proportions and cured under conditions of temperature and moisture similar to those existing on the work. Where possible, the form work shall be left longer as it would assist the curing.

Stripping Time: In normal circumstances where ordinary Portland cement is used and adequate curing is done, form work may generally be removed after expiry of the following period:

Type of Formwork	Minimum Period Before Striking Formwork
a) Vertical formwork to columns, walls, beams	24-48 hours
b) Soffit formwork to slabs (Props to be refixed Immediately after removal of formwork)	3 days
c) Soffit formwork to beams/ Flat slabs. (Props to be refixed immediately after removal of formwork)	7 days
d) Props to slabs:	
1) Spanning up to 4.5 m	7 days
2) Spanning over 4.5 m	14 days
e) Props to beams and arches:	
1) Spanning upto 6 m	14 days
2) Spanning over 6 m	21 days

The number of props left under the concrete element, their sizes and dispositions shall be such that they shall be able to safely carry the full dead load and live load likely to occur during further construction.

The contractor shall be liable for damage and injury caused by removing the forms or props before the concrete has gained sufficient strength.

5.40 Conditions on RCC slabs/ Roof Slabs

5.40.1 The R.C.C. slab laid should be leak proof. After observing for two rainy seasons as defect liability period if the roof or floor is found to be perfectly leak proof and no moisture or dampness is seen underneath at ceiling of the slab, the contractor can ask for refund of E.M.D. or F.S.D. from the Company. If there are any defects noticed after laying of roof they must be attended to by the contractor at his own cost. Further the contractor must arrange to get the structure treated as per clause 21 of ISI code No.456/2000 at his own cost on the instructions of the Company.

When R.C.C. slab is laid, the contractor shall carry out the following tests at his own cost to prove that the slab is impervious.

- a) After the centering is removed and curing period is over the slabs shall be put to test by stagnating water of 15 cms depth for one week and watched carefully to test the leakages if any.
- b) If there are any leakages, the contractor shall immediately rectify the same at his own cost and again test the same to see that there are no leakages. No payment will be made to the contractor on this account either for testing or for rectifications thus carried out.
- c) The officer observing the leakage test shall issue a certificate to this effect before the final bill is made.

5.40.2 The variation thickness of R.C.C. roof slab due to varying spans, or special covering materials should not affect the general roof bed which should be uniform unless otherwise shown in drawings or instructed.

5.40.3 For all slabs to be laid MS hooks to be provided as directed by the Company for fixing fans and lights etc., G.I. pipes or PVC pipes has to be provided as directed by the Company in the masonry walls or concrete at the specified places for making electrical wiring.

TABLE – IV

For Vibrated Reinforced Concrete Items (V.R.C.C.)

Characteristic Strength of Cube at the age of 28 days of curing

M-30	1:0.75:1.5	30 N/mm²	300 Kgs / cm ²
M-25	1:1:2	25 N/mm²	250 Kgs / cm ²
M-20	1:1.5:3	20 N/mm²	200 Kgs / cm ²
M-15	1:2:4	15 N/mm²	150 Kgs / cm ²
M-10	1:3:6	10 N/mm²	100 Kgs / cm ²

5.41 Cement Plastering in two coats CM 1:6 & CM 1:4 (APSS 901, 903 & 904)

5.41.1 The surface shall be prepared by roughening of the background and raking the joints. The surface of the wall shall be kept wet for 2 hours before plastering.

5.41.2 Guides: Patches of 15cm X 15cm of required thickness at not more than 2 meters intervals horizontally and vertically shall be applied over the entire surface truly in the plane and truly plumb to serve as guides.

5.41.3 Plaster shall be started from the top and worked down towards plinth. The work shall be tested frequently with a plumb bob and straight edge.

5.41.4 The Mortar in 1:6 proportions shall be dashed and pressed over the surface and then brought to smooth and uniform surface by means of float and trowel. The plaster shall be well pressed into the joints.

5.41.5 After the first coat the surface is left rough to receive the second coat. The final coat shall be applied a day or two after the first coat put on has set, but the first coat shall not be allowed to dry. The final coat shall consist of 1 part of cement to 4 parts of fine sieved sand and shall be applied as in the first coat and brought to a uniform surface and then finished with a sponge to give granular appearance.

5.41.6 All corners, junctions and arises shall be brought truly to a line, level and plumb.

5.41.7 The finished surface shall be watered for a period of at least 10 days.

5.41.8 Theoretical requirement of cement for plastering should be as follows:-
Cement bags of 50 kgs.

a. 12 mm plastering in C.M. (1:5) & C.M. (1:3)	1.02 bags per 10 Sqm.
b. 12 mm plastering in C.M. (1:6) & C.M. (1:4)	0.82 bags per 10 Sqm.
c. 20 mm plastering in C.M. (1:6) & C.M. (1:4)	1.15 bags per 10 Sqm.
d. 12 mm plastering in C.M. (1:4)	1.08 bags per 10 Sqm.
e. 12 mm plastering in C.M. (1:6)	0.72 bags per 10 Sqm.

5.42 **Waterproof plaster over the roof**

5.42.1 On the clean wet surface of the concrete slab, before it has set, a layer of cement plaster shall be laid to give an average depth of 20mm over the concrete.

5.42.2 The Mortar to be used shall be of CM 1:3 proportions mixed thoroughly with a standard water proofing material with water repelling properties to ensure non-absorption.

5.42.3 Gauges should be put on the floor about ten feet apart to ensure even thickness.

5.42.4 Plastering must be done in squares or strips to avoid cracks. After the floor has been completed, it shall be covered with two inches of grass; sand or saw-dust and kept wet for three weeks.

5.43 Pointing: (APSS - 906)

5.43.1 Cement mortar for pointing shall conform to SS: 115 and shall be of 1:3 proportions. The joints in the masonry shall be raked out to a depth no less than the width of the joint, when the mortar is green. Joints are to be brushed clean of dust and loose particles with a stiff brush. The area shall then be washed, and the joints thoroughly wetted before pointing is commenced.

5.43.2 The mortar shall be pressed into the raked out joints according to the type of joint required. The mortar shall not be spread over the corners, edges or surface of the masonry. The pointing shall then be finished with proper tool. The superfluous mortar shall be cut off from the edges of the line and the surface of the masonry shall be cleaned of all mortar.

5.43.3 Pointing could be either flush pointing, or groove pointing.

5.44 Notes on Pointing

- i) Flush pointing with a groove or a line appears neat and does not spoil the look of the stone or brick masonry.
- ii) As far as possible a minimum amount of mortar shall be used to avoid wastage.
- iii) The edges shall be neatly trimmed with a trowel and a straight edge.
- iv) While mortar is green a groove shall be formed by running a tool along the center lines of the joints. This operation shall be continued till a smooth and hard surface is obtained.
- v) Even the vertical joints shall be finished in a similar fashion.
- vi) Even when the job is done carefully, there is always an amount of superfluous mortar sticking to the masonry. This should be wiped off with a wet cloth.
- vii) After the work is set and dried i.e., after one or two days the stones shall be cleaned with a strong acid so as to remove the cement stains.
- viii) After cleaning with acid, the stones shall be cleaned with soap water to ensure the natural colour of the stones.
- ix) If care is taken as shown above the pointing work will look attractive and neat, and the natural appearance of the stone masonry is retained.

5.45 Flooring: (APSS 701 & 702)

5.45.1 Granite Flooring:

The flooring shall be with high polished colour granite stone slabs 18 to 20 mm thick of size not less than 2.40 mts length, laid over existing RCC slab or CC bed.

All the stones in one room shall be preferably of the same width and shade. The width of all the slabs in one row must be uniform with longitudinal joints parallel to each other.

The joint width shall be kept to a minimum, and the sides of the slab shall be chisel dressed to ensure a correct joint.



Raw-silk- pink granite



Raw-silk-Ivory-granite



Imperial- red- granite



Red-multi colour- granite



Kashmir- gold- granite

5.45.2 Granolithic concrete flooring (APSS No. 701 & 710)

The mix proportions for the Granolithic concrete floor topping shall be (1:2:4) (Cement: F.A. : C.A) by volume. The minimum amount of water which will give necessary workability for adequate compaction shall be added. The grading of the course aggregate for Granolithic concrete shall be from 6mm to 12mm. The finished thickness of flooring shall be 50mm thick or as specified in the approved drawings and the panels into which the floor is divided for laying the Granolithic concrete shall not have any panel dimensions in excess of 5.0m.

5.46 Joinery:

For all wood/iron/ Aluminium work a sample of each item i.e., frame with shutters complete should be prepared and got approved by the ED, JETL before they are manufactured in full quantities and fixed in position.

The furniture and fixtures and wind appliances for woodwork should be of the best quality available in the market, and should be got approved by the ED, JETL before fixing.

5.47 Door Frame:

Wooden Doors & Windows:

The wood shall be of Best Sal wood/Best Teak wood as specified in Bill of quantities for frames and shutters.

The wood shall be well seasoned, uniformly coloured and shall be free from knots, cracks, shakes, splits, cross grains etc.

The wood shall be durable and of reasonably straight grains.

Moisture content of the wood used shall be as near as possible to the following values:

Recommended **values** of **moisture content** in timber at the time of assembly or framing.

Type of work	Coastal area	Inland area
Frames of windows	16 to 18%	14 to 15%
Shutters of windows etc.	15 to 16%	12 to 14%

Construction and fixing

Frames shall have dovetail, tenon or mortise joints.

Before fixing in position, the frames shall be inspected and passed by the Engineer-in-charge. A coat of primer shall be applied before the frames are fixed in position. All portions of untreated timber abutting against masonry or concrete shall be painted with boiling coal tar or approved preservative, before placed in position.

The frames shall be erected in position and held plumb with strong supports from both sides.

Hold fasts shall be embedded in C.C. beds as specified.

Frames shall have dovetail, tenon or mortise joints.

Frames without sills shall be provided with temporary wooden bracings between the styles at sill level which can be withdrawn after the frame is firmly set.

5.48 Steel Door frames:

M.S. Hollow door frames manufactured by cold roll formed process steel sheet 1.25mm thick bright **CRCA** confirming to IS 4351-1976 with 105 x 60mm size.

5.49 Fabrication: The steel door frames shall be got fabricated in an approved workshop as approved by the Engineer.

5.50 Mortar Guards: Mortar guards as instructed by the ED, JETL shall be provided. These shall be welded to the frame at the head of the frame for double shutter doors to make provision for bolts.

5.51 Lock-Strike Plate : There shall be an adjustable lock- strike plate of steel complete with mortar guard to make provision for locks or latches complying with the relevant Indian Standards. Lock-strike plate shall be of galvanised mild steel and fixed at 95cm from the head of the frame.

- 5.52 Shock Absorbers :** For side hung door there shall not be less than three buffers or rubber or other suitable material inserted in holes in the rebate and one shall be located on the centre line of the lock strike plate and the other two at least 45cm above and below the centre line of the lock strike plate. For double shutter doors, there shall be two buffers of rubber or similar suitable material inserted in holes in the rebate in the lock jamb only at the head and spaced 15cm at either side of the centre line of the door.
- 5.53 Finish:** The surface of door frame shall be thoroughly cleaned, free of rust, mill-scale dirt, oil etc. either by mechanical means, for example, sand or shot blasting or by chemical means such as picking. After pretreatment of the surface one coat of approved primer, i.e. red oxide zinc chrome primer conforming to Ito 2074:79 and two coats of paints as directed by the JETL shall be applied to the exposed surface.
- 5.54 Fixing:** frames shall be fixed up right in plumb. To avoid sag or bow in width during fixing or during construction phase, temporary struts across the width preventing sides bulging inward may be provided. Wall shall be built solid on each side and grouted at each course to ensure solid contact with frame leaving no voids behind the frame. The Hollow frame section shall be filled with CC (1:2:4) using 20mm grade HBG metal. Three lugs shall be provided on each jamb with spacing not more than 75 cm. The temporary struts should not be removed till the masonry behind the frame is set. In case screwed base tie is provided, this should be left in position till the flooring is laid when it can be removed. After pretreatment of the surface, one coat of steel primer and two coats of paint, as directed by the ED, JETL shall be applied to the exposed surface.
- 5.55 Flush shutters for doors:**
- 5.55.1 Flush shutters (Double/Single) :** should be factory made ISI marked confirming to IS 2202-1991 (part-I), 35mm thick with bond wood solid block board type core having cross bonds and face veneers hot pressed bonded with water proof phenol formaldehyde synthetic resin, with lipping on all sides.
- 5.56 Construction:** The block board core shall confirm to the requirements specified in clause 7.1.1. of IS 2202 (Part I) : 1991. The frame constructed of stiles and rails shall be provided for holding the core. The width of the frame including internal lipping shall not be less than 45 mm and not more than 75 mm.
- 5.56.1 Plywood:** used in flush door shutter shall confirm to IS 710 : 1976 with surface requirements confirming to type AB of IS 303 : 1989.
- 5.56.2** Cross-bands used in flush door shutter shall confirm to the requirements laid down in IS 710:1976.

- 5.56.3 **Face Veneers:** used in flush door shutters shall confirm to the requirements laid down for veneer for BWP grade plywood in IS 710:1976.
- 5.56.4 All Plywood, cross – boards and veneer used shall be treated in accordance with clause 6.1.5.1. of IS 2202 (Part I) : 1991.
- 5.56.5 Adhesive used for bonding plywood or cross bond and face veneer to core shall be phenol formaldehyde synthetic resin adhesive confirming to BWP grade specified in IS 949:1974.
- 5.56.6 Internal lipping shall be of Teak wood and shall have a total depth not less than 25mm. It may be provided separately, when it is of species different from that of backing or as one piece with the style, designated as frame-cum-lipping, when internal lipping and backing are of the same species.
- 5.56.7 External lipping shall be of teak wood and shall be solid and shall measure at least 6mm on the face of the door. It shall be provided all round the shutter in case of single shutter and on three sides in case of double shutter.
- 5.56.8 In case of double leaved shutters, the sheeting of the stiles shall be rebated by 8mm to 10mm. The rebating shall be either splayed or square type as per clause 7.7 of IS 2202 (Part – I) : 1991. The depth of lipping at the meeting of stiles shall not be less than 30mm.
- 5.56.9 Shutter shall be shop prepared for taking mortise locks or latches as may be ordered.
- 5.56.10 Workmanship and the finish of the face panels shall be in conformity with those specified in IS 303:1989
- 5.56.11 **Tests:** Knife test, glue Adhesion test, End Immersion test, slamming test shall be carried out as per clause 10 of IS 2202 (Part – I) 1991. The sampling and criteria for conformity, making etc. shall also be as per IS 2202 (Part – I) : 1991.

5.57 **Windows**

5.57.1 **Seccolar Systems**

a. Windows / Ventilator

Windows / Ventilators fabricated from pre painted Steel Sections, made out of cold rolled steel as per ISD 513 of 0.6mm thick 'D' quality, galvanized as per IS 277 with zinc of 120 gm/sq.mtr.

Primer Coat of Epoxy Primer of 7 microns thick, finish paint with a modified polyester paint of thickness between 13 – 20 microns, and back coat with Alkyd/Polyester of 7-12 microns. The size of profiles is approximately 56 x 46mm for internal shutter frames and 46 x 52mm for External shutter frames. Shutter is fitted with 4mm thick plain/pinheaded glass fixed with EPDM gaskets in the groove provided in the profile.

b. Doors

Doors fabricated from Pre-Painted Steel Sections, made out of Cold Rolled Steel as per IS 513 of 0.6mm thick 'D' quality, galvanized as per IS 277 with zinc of 120gm/se.mtr. Primer Coat of Epoxy Primer of 7 microns thick, finish paint with a modified polyester paint of thickness between 13-20 microns, and back coat with Alkyd/Polyester of 7-12 microns. The size of profiles is approximately 46 x 46mm for Internal Shutter frames and 46 x 52mm for External Shutter frames, middle and bottom jambs of size 23 x 130mm and panels filled with Glass/Board.

5.80 ALLUMINUM DOORS, WINDOW & VENTILATORS:

- (i) Aluminium doors, windows and ventilators: All extruded aluminium section to be used for fabrication shall be hollow aluminium alloy extrusions confirming to designation 63400 of IS: 1285. Aluminium Doors, Windows and Ventilators shall confirm to IS 1948:1961
- (ii) All extruded aluminium sections and fixtures shall be coated with natural colour anodic coating in accordance with IS 1868.
- (iii) The mortice locks shall be provided in accordance with IS 2209.
- (iv) The floors springs (hydraulically regulated) shall be in accordance with IS 6315:1992.

5.9 Q.C. Clearance: The doors & windows (both frames & shutters) and ventilators should be got cleared by the Engineer / Quality Control agency authorized by the JETL. The tests will be conducted at the manufacturer's place and Q.C. clearance certificate will be issued for the lot before supply to site for use in construction. All the arrangements for testing at the manufacturer's place should be made by the contractor at his cost. No door, window or ventilator should be fixed without clearance from the Engineer/ Q.C. agency. The contractor should inform the Engineer/Q.C. agency for testing and clearing at least 7 days in advance.

6.0 ADDITIONAL SPECIFICATIONS:

6.1 Anti Termite Treatment

If the site is infected with white ants, all the ant hills shall be dug out completely and queen ants destroyed. Anti-termite treatment, before construction in foundation and basement where required shall be done as per I.S. code 6313 Part II 2001.

Chemicals used, the relevant I.S. specifications for the same and their usual concentrations as water emulsions for soil treatment shall be as given in table 201.9 of S.S. 201 APSS.

6.2 Structural Glazing:

The structural glazing shall be made up of electro colour anodized (having 15 micron anodic coating) aluminium structural sections of not less than 101.5 x 57 x 2 mm box

sections for all mullions and not less than 63 x 57 x 2 mm box section for all transoms of structural glazing

system and sub frame of 26.5 x 20 x 1.8 mm size. The members shall be fixed in grid pattern mechanically joined with Aluminium cleats and GI metal screws. The frame shall be fixed to the beam / slab/ soffit with GI brackets and fasteners. Glazed panels shall be made using 5 mm thick heat strengthened reflective glass of St. Gobain / Glaverbel / Equivalent make fixed to the sub frame with 6 x 12mm spacer tapes of Norton make or equivalent and structural silicone bonding using G.E. SILICONE (SSG 4000) or DOW CORNING (795). The gaps between glazed panels shall be sealed with suitable Bakor rod and Silicon weather sealant of GE / DOW CORNING are to be applied to provide water tightness of glazing frame. Necessary masking tapes are to be used to prevent spreading of sealant over glass panels.

6.3 ACP Cladding:

The Aluminium wall cladding shall be fabricated with a minimum of 4mm thick Aluminium composite panel of approved make comprising of thermoplastic resin core sandwiched between two skins of 0.25mm thick aluminium alloy. The panel shall be PVDF coated to a minimum of 35-micron thickness of approved metallic colour. The resin content of PVDF shall be 75% to 80%. The back of the panel shall be chromatised 3 -4 microns. The Aluminium composite panel shall be mounted on frames made of 50 x 25 x 1.5 mm aluminium extruded tubes fixed to the column / beams / walls with Anchor bolts, screws and GI brackets and fasteners wherever required.

6.4 Aluminium Louvers:

Supply and fixing of powder coated (approved shade) Aluminium Louvers, using 63 x 37 x 1.5mm, Aluminium box section for main frame, the aluminium louver blades of size 103 x 50 x 1.5 mm thick shall be fixed to the main frame using G.I sheet metal screw as shown in the drawing. The spacing between each louver blade shall be 75 mm.

6.5 Blasting Operations

Blasting operations when considered necessary shall be resorted to only with written permission of the ED, JETL. Where blasting is resorted to only small charges shall be used. Prior inspection shall be carried out for the safety and stability of the public property. Blasting operations in the proximity of over head power lines, communication lines, or other structures shall not be carried until the operator or the owner of both of such lines have been notified and precautionary measures deemed necessary shall be taken as per the procedure laid down in S.S. No. 203 APSS and code 4081-1986 shall be followed.

Excavation in Hard rocky chiseling:

This includes rock which is easily excavated by blasting, but due to close proximity of structures or any other reason that the ED, JETL may consider, will have to be excavated by chiseling.

The contractor may resort to any of the following methods to excavated rock by chiseling:

- (i) Wedging by means of crowbars, pick axes or pneumatic drills
- (ii) Heating and quenching
- (iii) Controlled blasting with a small charge just sufficient to make a crack in rock which will be subsequently removed by wedging.

No extra payment shall be made for removal of rock by chiseling and controlled blasting.

6.6 a) Expansion Joints

Structures in which marked changes in plan dimension take place abruptly shall be provided with expansion joint at the section where such changes occur. Expansion joint shall be so provided that the necessary movement occurs with a minimum resistance at the joint. The structures adjacent should preferably be supported on separate columns of walls but not necessarily on separate foundations. Reinforcement shall not extend across an expansion joint and the break between the sections shall be complete. The details as to the length of a structure where expansion joints have to be provided can be determined after taking into consideration various factors such as temperature exposure to weather etc. For the purpose of general guidance however it is recommended that structure exceeding 45M in level to shall be decided by one or more expansion joints (SS No. 403.8 & IS 456).

b) Construction Joints

Vertical joints in floor and roof slabs shall be provided in the case of long buildings of more than 30M in length, especially when the width or depth of such buildings are less than 15M and when narrow corridors connect blocks of relatively greater width. The most suitable position for such vertical joints is where the corridors take off from inner blocks. On soils such as black cotton, such joints are more essential shall be invariably provided at the places shown in the drawing or as directed by the Engineer-in-charge. Construction joints, when necessary, shall be located as follows.

In the main beam over the centre of support. No vertical joint shall be permitted in case of main beams. In other cases, they shall be provided, if necessary, in the following location.

- i) In subsidiary beams at mid span.

- ii) In the case of slabs, the joints wherever possible shall be parallel to main reinforcement. In the case of one-way reinforced slabs and over the centre of supporting beams or walls in other cases. In general, the joints shall not be provided in locations of considerable shear or under concentrated loads.

Suitable water stops as specified shall be provided in the case of water retain structures (SS No. 403.7).

6.7 Bearings of R.C.C. Slabs & Beams.

- a) Where supports are not monolithic with the beam or slab the bearing surface shall be plastered with cement mortar 1:3 with the craft paper laid over the plaster, before laying the concrete.
- b) The vertical face of the masonry rebate at bearings shall be plastered smoothly with CM 1:3. For beams the craft paper shall be continued to the sides by folding the paper neatly to the plastered vertical face of the masonry opening.

6.8 Load testing of structures

Load testing of structures shall conform to SS No. 403 APSS. Load tests on completed structures shall be made of required by the specifications or condition of contract or by the ED, JETL in the event of reasonable doubt as to the adequacy of the strength of the structure. Such tests shall be carried out after expiry of 56 days of effective hardening of the concrete test loading of structures, allowable deflections, recovery of deflection etc., shall be as per clause 17.6 of IS: 456-2000.

6.9 OVERHEAD TANKS

- 6.9.1 The tenderer shall be solely responsible for handing over a watertight structure. Failing which, he will not be entitled to final payment under this contract. The period of guarantee required for the contract, before which he will not be entitled to final payment under this contract, shall be two years after completion of the reservoir and putting in into commission and-during this period the structure under full working head of water shall neither develop any defects which will endanger its stability, nor shall it show signs of leakage. The above guarantee period of two years shall commence from the date of first filling of the reservoir with water up to the maximum water level.
- 6.9.2 Cash security to the value of 5 (five) percent of each bill will be recovered from payments due to be made to the contractor and credited to deposits. These deposits together with earnest money arid security deposit required under the terms of the contract will be retained till the expiry of the guarantee period and until a certificate of soundness of the structure is furnished by the ED, JETL. The whole of the above sum together with any recovery, from the payment already made, as may be assessed by the ED, JETL shall be forfeited to the Company if the reservoir developed leaks. The above percentage recovery shall be exclusive of the amount withheld under Clause 68 of Preliminary Specifications to the APSS.

- 6.9.3 The work shall be executed according to the standard specifications for the reinforced concrete given in APSS and relevant Indian Standard No. IS:3370 parts I, II and IV and also the notes on reinforced concrete, contained therein, subject however to the modifications indicated hereunder. All concrete shall be mixed in power or diesel driven concrete mixers and placed in such a manner so as to prevent segregation of heavy aggregate. It is absolutely essential that most careful attention is paid by the contractor in preparation, mixing and placing to secure a dense concrete necessary for watertight structure. Special care is necessary at expansion joints, where a 6" wide Rubber water stopper is to be inserted and all construction joints shall be treated as stipulated in IS:3370 part I to ensure water tightness. The amount of water required to produce the least shrinkage effects should be carefully gauged. The clear cover of reinforcement rods shall conform to those specified in IS:3370 Part II.
- 6.9.4 The contractor should be prepared to arrange on his own responsibility sufficient number of concrete mixers and vibrators as may be required. Test cubes should be taken and tested periodically at the expense of the contractor and the results shall confirm to IS:456-1964. No patent water proofing compound shall be mixed in concrete, nor applied to the surface nor shall plastering be done to the interior of the reservoir as those are liable to give defective results on the life and water tightness of the reservoir.
- 6.9.5 All faces of the reservoir interior, and sub-structures shall be free from honeycombing and shall present a smooth dense surface and shall be free from work ridges and shall be given cement wash to improve the appearance. If any honey combing is seen on the finished surface of the concrete, it shall be rectified by guniting at the contractor's expense.
- 6.9.6 Testing and Inspection of Tanks:
After the tank is constructed, it shall be filled gradually with potable water. During testing, lime or sodium silicate or any other chemical shall be added to the water. After filling the water up to full supply level (Le. MWL) of the tank, it is maintained for seven days initially. After this initial period, the fall in the water level shall be obtained at every 24 hours interval for a further period of seven days.
The average loss of water in 24 hours shall not exceed the following:
a) 0.1% of the capacity of tank
b) 5mm fall in the level
c) 2 Litres per Sq. Metre of the water contact area.
- 6.9.7 Additional allowance upto 0.5mm fall in level may be made for high exported loss in summer depending upon the local conditions. Records shall be kept of leaks, if any, at different levels of water.
- 6.9.8 If the water tightness test is still found to be not satisfactory the contractor shall be required to carry out tests to localise the leakages at his cost.
The contractor shall then be required to take such measures as the JETL specify to make the structure watertight to the extent described. Entire rectification work shall be at the contractor's cost. All the arrangements required for testing shall be at the

contractor's cost. Payment will be made at the quoted rate only after conducting water tightness test successfully however subject to operation of condition.

7.0 Safety Specification:

- 7.0.1** All the necessary safety appliances as per IS: 4130 shall be issued to the workers and their use explained. It shall be ensured that the workers are using all the safety appliances while at work.
- 7.0.2** Walkways and passageways shall be provided for the use of the workman who shall be instructed to use them, and all such walkways and passageways shall be kept adequately lighted, free from debris and other materials.
- 7.0.3** During night, red lights shall be placed on or about all the barricades.
- 7.0.4** All the roads and open areas adjacent to the work site shall either be closed or suitably protected.
- 7.0.5** All nails in any kind of lumber shall be withdrawn, hammered or bent over as soon as such lumber is removed from the structure and placed in pipes for future cleaning or burning.
- 7.0.6** No electric cable or apparatus which is liable to be a source of danger, or a cable or apparatus used by the operator shall remain electricity charged.
- 7.0.7** Where in any work of demolition it is imperative, because of danger existing to ensure that no unauthorized person shall enter the site of demolition outside working hours, a watchman should be employed. In addition to watching the site, he shall also be responsible for maintaining all notices, lights and barricades.
- 7.0.8** On every demolition job, danger signs shall be conspicuously posted all-round the structure and all door openings giving access to structure shall be barricaded or marked except during the movement of actual workmen or equipment. However, provision shall be made for at least two independent exits for escape of workmen during any emergency.
- 7.0.9** The removal of a member may weaken the side wall of an adjoining structure and to prevent possible damage, these walls shall be supported until such time as permanent protection is provided. In case any danger is anticipated to the adjoining structure the same shall be got vacated to avoid any danger to human life.
- 7.0.10** The power on all electrical service lines shall be shut off and all such lines cut or disconnected at or outside the property line, before the demolition work is started. Prior to the cutting of such lines the necessary approval shall be obtained from the electrical authorities concerned for the demolition work itself.
- 7.0.11** All gas, water, steam and other service lines shall be shut off and capped or otherwise controlled at or outside the building line, before demolition work is started.
- 7.0.12** All the mains and meters of the building shall be removed or protected from damage.
- 7.0.13** If a structure to be demolished has been partially wrecked by fire, explosion or other catastrophe, the walls and damaged roofs shall be shored or braced suitably.

- 7.0.14** All practical steps shall be taken to prevent danger to persons employed from risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so overloaded with debris.

1.0 DRAWINGS: CIVIL, PEB & STRUCTURES

- 1.1 The plans enclosed as **Annexure – II** with the tender are liable to be altered during execution of work as per necessity of site conditions. The premium quoted by the contractor for various items shall hold good for execution of work even with altered plans.
- 1.2 One set of drawings, on the basis of which actual execution of the work is to proceed shall be furnished free of cost to the contractor by the ED, JETL progressively according to the work program submitted by the contractor and accepted by the ED, JETL. Drawings for any particular activity shall be issued to the contractor at least 30 days in advance of the scheduled date of the start of the activity. However, no extra claims by the contractor toward any delay in issue of drawing or issue of any revision / change to the drawings issued earlier shall be admissible. The ED, JETL shall intimate the contractor 7 days in advance regarding any delay to issue of drawings, for any particular stage of works. If work gets effected due to delay to issue of drawings, for any particular stage of work the contractor shall be granted extension of time in terms of condition 14.7 of tender notice.
- 1.3 Signed drawings above shall not be deemed to be an order for work unless they are entered in the agreement or schedule of drawings under proper alterations of the contractor and JETL or unless they have been sent to the contractor by the ED, JETL with a covering letter confirming that the drawing is in and authority for work in contract.

2.0 DISCREPANCIES:

- 2.1 In case of discrepancies between documents the following order of procedure shall apply: -
- 2.1.1 Between the written description of written dimensions in the drawings and the corresponding one in the specifications, the latter shall apply.
- 2.1.2 Figured dimensions shall supersede scaled dimensions. The drawings on a larger scale shall take precedence over those on a smaller scale.
- 2.1.3 Drawings issued as construction drawings from time to time shall supersede tender drawings and also the correspondence drawings previously issued.

Note: The contractor should not execute any component of work without obtaining the working drawings. Any work done without drawings shall be at the contractors' responsibility only. Acceptance for such work will be at the discretion of the ED, JETL.

3.0 SECRECY CLAUSE:

The drawings and specifications made available to the tenderer shall exclusively be used on the work and they are retained from passing on each plan to any unauthorized hand either in parts or in full under the provisions of Section-3 and 5 of the official secrets Act 1923. Any violation in this regard will entail suitable action under appropriate clause or official secret Act 1923.

BILL OF QUANTITIES AND PRICE BID.

NAME OF THE WORK: UP-GRADATION OF CETP – CIVIL & PEB WORKS LIKE, CONSTRUCTION OF FOUNDATIONS FOR RO & SLUDGE STORAGE SHEDS, RCC STORAGE TANKS, HOPPER BOTTOM TANKS FOR WASTEWATER STORAGE AND TREATMENT AS PER THE ATTACHED DRAWING AT JEEDIMETLA EFFLUENT TREATMENT LTD. [JETL], PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL-MALKAJGIRI DIST., TELANGANA STATE, INDIA.

PREAMBLE

1. The Bill of Quantities shall be read in conjunction with the instructions to Tenderers, General and Special conditions of Contract Technical Specifications and Drawings.
2. The quantities given in the Bill of Quantities are estimated and provisional and are given to provide common basis for tendering. ***The quantities here given are those upon which the lumpsum tender cost of the work is based but they are subject to alterations, omissions, deductions or additions as provided for in the conditions of this contract and do not necessarily show the actual quantities of work to be done.*** The basis of payment will be actual quantities of work ordered and carried out as measured by the Contractor and verified by the ED, JETL and valued at the estimate rate plus or minus tender percentage quoted in the Bill of Quantities where applicable, and otherwise at such rates and prices as the ED, JETL may fix within the terms of Contract.
3. The estimate rates in the Bill of Quantities shall, except in so-far as it is otherwise provided under the Contract include cost of all constructional material, labour, machinery, transportation, erection, maintenance, profit, taxes and duties together with all general risks, liabilities and obligations set out or implied in the Contract.

4. The plans enclosed with the tender are liable to be altered during execution of work as per necessity of site conditions. The Tender percentage quoted by the tenderer shall hold good for execution of work even with altered plans.
5. The whole cost of complying with the provisions of the Contract shall be included in the estimated rates for items provided in the Bill of Quantities and where no items are provided in the Bill of Quantities, their cost shall be deemed to be distributed among the estimate rates entered for the related items of work.
6. General directions and descriptions of work and materials are not necessarily repeated nor summarised in the Bill of Quantities. References to the relevant sections of the Contract documentation shall be made before entering estimate rate against each item in the Bill of Quantities.
7. The method of measurements of completed work for payment shall be in accordance with the relevant B.I.S. Codes & A. P. S. Specifications.
8. All items of work are to be executed as per the drawings / specifications supplied with the contract documents.

If there is any contradiction between the drawings and the text of the specifications, the later shall prevail.

9. The Tenderer should inspect and select the quarries of his choice before he quotes the tender percentage in the Schedule of Bill of Quantities and satisfy himself about the availability of required quantum of materials.
10. Diversion drains should be excavated before completion of the embankments and useful soil should be used in the nearby embankments.
11. The actual mix proportion by weight to be adopted during execution will be designed in the laboratories to suit the grade of concrete and mortar to be used. It will be the responsibility of the contractor to manufacture concrete and mortar of required strength.
12. The quantum of measurement for all items of earthwork involving conveyance manually or by machinery shall be as assessed by level measurement. The measurements for the embankment will be for the consolidated banks only.
13. Wherever bailing out of water is involved either for excavation or for foundations or for constructions, the percentage quoted shall take into account the de-watering charges necessary. No separate payment will be made for de-watering.

14. Wherever embankment work is involved, useful soil approved by the ED, JETL from the cutting reaches and diversion drains shall be taken and used for forming nearby embankments soils used for constructions will be at free of cost.
15. The quoted tender percentage shall also include the work of any kind necessary for the due and satisfactory construction, completion and maintenance of the works according to the drawings and these specifications and further drawings and orders that may be issued by the ED, JETL from time to time. The quoted tender percentage shall include compliance by the Contractor with all the general conditions of contract, whether specifically mentioned or not in the various clauses of these specifications, all materials, machinery, plant, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshop staff, labour and the provision of proper and sufficient protective works, diversions, temporary fencing and lighting. It shall also include safety of workers, first aid equipment suitable accommodation for the staff and workmen, with adequate sanitary arrangements, the effecting and maintenance of all insurance, the payment of all wages, salaries, fees, royalties / Taxes, duties or other charges arising out of the execution of works and the regular clearance of rubbish, reinstatement and clearing-up of the site as may be required on completion of works safety of the public and protection of the works and adjoining land. The work of Building in quality control / assurance shall be deemed to be covered in the quoted percentage.
16. The Contractor shall ensure that, the quoted tender percentage shall cover all stages of work such as setting out, selection of materials, selection of construction methods, selection of equipment and plant, deployment of personnel and supervisory staff, quality control testing etc. The work quality assurance shall be deemed to be covered in the tender percentage.
17.
 - a) The special attention of the tenderer is drawn to the conditions in the tender notices wherein reference has been made to the Andhra Pradesh Standard Specifications [APSS] and the Standard preliminary specifications contained therein. These preliminary specifications shall apply to the agreement to be entered into between the contractor and the Executive Director, JETL. of Andhra Pradesh/Telangana and shall form an in-separable condition of the contract along with the estimate. All these documents taken together shall be deemed to form one contract and shall be complimentary to another.
 - b) The tenderer shall examine, closely the A.P.S.S. / MOST and also the standard preliminary specifications contained therein and sign the Authorized person of company's office copy of the APSS / MOST and its addenda volume in token of such study before submitting his overall tender percentage which shall be for finished work in-situ. He shall also carefully study the drawings and additional specifications and all the documents, which form part of the agreement to be entered into by the successful tenderer. The APSS / MOST and other documents connected with contract such as estimate plans, specifications, can be seen on all working days in the office of the ED, JETL.

18. The tenderers attention is directed to requirements for materials under the clause 'materials and workmanship' in the preliminary specifications of APSS. Materials conforming to the Bureau of Indian Standards specifications, APSS etc., shall be used on the work and the tenderers shall quote his overall tender percentage accordingly.
19. The tenderer has to do his own testing of materials and satisfy himself that they conform to the specifications of respective I.S.I. Codes before tendering.
20. The contractor shall himself procure the required construction materials of approved quality including the earth for formation of embankment and water from quarries / sources of his choice. All such quarries / sources of materials required for the work shall be got approved by the ED, JETL in writing well before their use of the work.
21. The contractor shall himself procure the steel, cement, Bitumen, Blasting materials, sand, metal, soils, etc., and such other materials required for the work well in advance. The contractor has to bear the cost of materials for conveyance. The Company will not take any responsibility for fluctuations in market in cost of the materials, transportation and for loss of materials etc.
22. Inspection of site and quarries by the tenderer: Every tenderer is expected before quoting his overall tender percentage, to inspect the site of proposed work. He should also inspect the quarries and satisfy himself about the quality, and availability of materials. The best class of materials to be obtained from quarries, or other sources shall be used on the work. In every case the materials must comply with the relevant standard specifications. Samples of materials as called for in the standard specifications or in this tender notice, or as required by the ED, JETL, in any case, shall be submitted for the ED, JETL's approval before the supply to site of work is begun.
23. The tenderer's particular attention is drawn to the sections and clauses in the A.P. standard specification dealing with
 - a) Test, inspection and rejection of defective materials and work.
 - b) Carriage
 - c) Construction plant
 - d) Water and lighting
 - e) Cleaning up during the progress and for delivery.
 - f) Accidents
 - g) Delays
 - h) Particulars of payments.The contractor should closely peruse all the specification clauses, which govern the overall tender percentage he is tendering.
24. The defect liability period of contract in terms for 13months.

25. The estimate rates for items shown in the Schedule "A" include all construction materials. No escalation in rates will be paid unless specified in the tender document. The tenderer has to quote an overall tender percentage considering all the aspects of the tender to complete the finished item of work as per the APSS / MOST / B.I.S. specifications, the special specifications appended, Drawings etc.
26. If there is any contradiction between APSS / MOST and B.I.S. specifications, listed and detailed technical specifications, the latter shall prevail.
27. In case of a job for which specifications are not available with the Schedule or in APSS / MORT&H or B.I.S. code and are required to be prescribed, such work shall be carried out in accordance with the written instructions of the ED, JETL.
28. The contractor should use the excavated useful soils and stone for construction purpose. Soils used for construction either for homogeneous section in hearting or in casing zone based on the suitability will be at free of cost and the cost of stone used for construction purpose will be recovered from the contractor's bill. The contractor should quote his tender percentage keeping in view of the above aspects.
29. Additions and alternations by the Tenderer in the Schedule of quantities will disqualify the tender.
30. In the case of discrepancies between the written description of the item in the Schedule "A" and the detailed description in the specification of the same item, the latter shall be adopted.
31. The Unit rates noted below are those governing payment of extras or deductions for omissions according to the conditions or the contract as set-forth in the preliminary specifications of the A.P. standard specifications and other conditions of specification of this contract.
32. It is to be expressly understood that the measured work is to be taken according to the actual quantities when in place and finished according to the drawings or as may be ordered from time to time by the ED, JETL and the cost calculated by measurement or weight at their respective rates without any additional charge for any necessary or contingent works connected works connected herewith. The Percentage Excess or less on ECV quoted are for works in situ and complete in every respect.
33. For all items of work in excess of the quantities indicated the rates payable for such excess quantities will be tendered rates i.e., estimate rates plus or minus tender percentage.
34. For all items of work, intermediate payment will be made provisionally as per relevant clause. Full-accepted agreement rates will be paid only after all the items of works are completed.
35. The contractor is bound to execute all supplemental works that are found essential incidental and inevitable during execution of main work.
36. The payment of rates for supplement items of work will be regulated as under.
Supplemental items directly deductible from similar items in the original agreement.

The rates shall be derived by adding to or subtracting from the agreement rate of such similar item the cost of the difference in the quantity of materials labour between the new items and similar items in the agreement worked out with reference to the schedule of rates adopted in the sanctioned estimate with which the tenders are compared.

a) Similar items but the rates of which cannot be directly deducted from the original agreement.

b) Purely new items which do not correspond to any item in the agreement.

The rate of all such items shall be estimated rates plus or minus overall tender percentage.

37. ENTRUSTMENT OF ADDITIONAL ITEMS.

a) Where ever additional items not contingent on the main work and outside the scope of original agreement are to be entrusted to the original contractor dispensing with tenders and if the value of such items exceeds the limits up to which the officer is empowered to entrust works initially to contractor without calling for tenders approval of next higher authority shall be obtained. Entrustment of all such items on nomination shall be rates not exceeding the estimate rates.

b) Entrustment of supplement items contingent on the main work will be authorized by the officers up to the monetary limits up to which they themselves are competent to accept items in the original agreement so long as the total amounts up to which they are competent to accept in an original agreement rates for such items shall be worked in accordance with the procedure prescribed in GO Ms.No.1493 PWD, dated: 25-10-1971 and as amended in Govt. Memo number 544 cod 72-22 dated: 06-07-1973.

c) Entrustment of either the additional supplemental items shall be further subject to the provisions under para 176(b) of APWD Code Viz., the items shall not be ordered by an officer on his own responsibility if the revised estimate or deviation statement providing for the same requires the sanction of higher authority.

Note: It may be noted that the term estimate rate used above means the rate in the sanctioned estimate with which the tender's compared or if no such rate is available in the estimate the rate derived will be with reference to the schedule of rates adopted in the sanctioned estimate with which tenders are compared.

BILL OF QUANTITIES

Bill of Quantities for Civil Works enclosed as Annexure - III

Bill of Quantities for PEB & Structural Works enclosed as Annexure - IV

PRICE BID

NAME OF THE WORK: UP-GRADATION OF CETP – CIVIL & PEB WORKS LIKE, CONSTRUCTION OF FOUNDATIONS FOR RO & SLUDGE STORAGE SHEDS, RCC STORAGE TANKS, HOPPER BOTTOM TANKS FOR WASTEWATER STORAGE AND TREATMENT AS PER THE ATTACHED DRAWING AT JEEDIMETLA EFFLUENT TREATMENT LTD. [JETL], PLOT NO – 267, PHASE – 1, IDA, JEEDIMETLA, HYDERABAD - 500055, MEDCHAL-MALKAJGIRI DIST., TELANGANA STATE, INDIA.

TENDERER QUOTED VALUE (IN FIGURES & WORDS):

I/We _____ do hereby express our willingness to execute the aforesaid work as per the conditions, standards, specifications, rules, regulations, etc., stipulated in the tender documents.

SIGNATURE, NAME OF THE TENDERER / AUTHORISED SIGNATORY

Sd/-
EXECUTIVE DIRECTOR
JEEDIMETLA EFFLUENT TREATMENT LTD.
Plot No.267, Phase-I, IDA, Jeedimetla, Medchal-
Malkajgiri Dist., Hyderabad-500055
Ph.No.8886446201/040-23092141
Email : spvcetp@jetltd.org

FORMATS OF SECURITIES

PROFORMA

BANK GUARANTEE FOR EARNEST MONEY DEPOSIT

WHEREAS (Name of the Contractor) (here in after called “the Tenderer”) has submitted his tender response to NIT No..... dated-..... for the work “” (Name of work) (hereinafter called “the tender”).

KNOWN ALL MEN by these present that we
..... (Name and Address of Bank)
(hereinafter called “the Bank” are bound unto / (name of the designated JETL) in the sum of * for which payment will and truly to be made to the said Company, the Bank binds itself, his successors and assigns by these presents.

SEALED with the Common Seal of the Bank this day of20....

THE CONDITIONS of this obligation are--

- (1) If after Tender opening the tenderer withdraws or modifies his Bid during the period of bid validity specified in the Form of Tender.
- (2) If the Tenderer having been notified of the acceptance of his bid by the Company during the period of validity.
 - (a) fails or refuses to execute the Form of Agreement in accordance with the Instructions to Tenderers, if required; or
 - (b) fails or refuses to furnish the balance EMD and additional performance Security in accordance with the instructions of Tenderers.

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

This Guarantee will remain in force up to and including the date** after the dead line for submission of Tenders as such deadline is stated in the Instructions to Tenders or as it may be extended by the Company, 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.

DATE.....

SIGNATURE OF THE BANK

WITNESS..... SEAL.....

(Signature, Name and Address)

-
- * The Tenderer should insert the amount of the EMD in words and figures denominated in Indian Rupee. This figure should be the same as shown in the NIT.
 - ** 6 months for the deadline date for submission of Tender. Date should be inserted by the Company before the Tender documents are issued.

PROFORMA

BANK GUARANTEE FOR BALANCE "E.M.D." (At the time of agreement)

_____(name & address of Company)

WHEREAS _____

_____(name and address of Contractor) (hereinafter called "the Contractor")
has undertaken, in pursuance of Contract No. _____ dated- _____ to execute the
work of _____ [name of work];

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall
furnish you with a Bank Guarantee by a Schedule bank for the sum specified therein as balance
EMD / EMD 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]
_____ [in words], such sum being 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] 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 up to..... i.e., until 28 days from the date of
expiry of the Defects Liability period.

Signature & seal of the Guarantor _____

Name of Bank _____

Address _____

Date _____

PROFORMA

BANK GUARANTEE FOR ADDITIONAL FURTHER SECURITY

(At the time of agreement)

_____(name and address of Company)

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 Contractor");

AND WHEREAS it has been stipulated by you in the said Contract that the Contractor shall
furnish you with a Bank Guarantee by a Schedule bank for the sum specified therein as Additional
further security bank guarantee 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 Rs. _____ [amount of guarantee]
_____ [in words], such sum being 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] 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 thereunder 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 up to and until 28 days from the date completion.

Signature & seal of the Guarantor _____

Name of Bank _____

Address _____

Date _____

Tenderer
Ltd.

130/132

for Jeedimetla Effluent Treatment

FORM OF SOLVENCY

CERTIFICATE BY BANKS

I, _____ Managing Director / Manager /
General Manager / Agent of _____ Bank Limited do
hereby certify that a _____
_____ *[here the Names and addresses of the contractor]* to be solvent to the
extent of Rs. _____ [Rupees _____]
_____] as disclosed by the information and record which are
available with the aforesaid bank.

For the _____ Bank

Date-

Place-

Signature of Bank Manager
[Authorised to Sign]

**FORMAT FOR EVIDENCE OF ACCESS TO OR
AVAILABILITY OF CREDIT FACILITIES
(CLAUSE 8 (iii) OF TENDER NOTICE)
(From Nationalised Banks / Scheduled Banks)**

BANK CERTIFICATE

This is to certify that M/s. is a reputed company with a good financial standing. If the contract for the work namely is awarded to the above firm, we shall be able to provide over draft/credit facilities to the extent of Rs..... to meet their working capital requirements for executing the above contract.

Signature of Sr. Bank Manager

Name of Bank