

NOTICE INVITING TENDER
Through
E-Procurement
For
Improvements to Mithra campus (IIIT SKLM Boys
campus) at Chinaravpalli (Vill), Etcherla (Mandal),
Srikakulam (Dist).

Proprietary & Confidential



RAJIV GANDHI UNIVERSITY OF KNOWLEDGE TECHNOLOGIES
IIIT Srikakulam
S.M.Puram (Vill), Etcherla (Mandal), Srikakulam Dist., A.P

STANDARD BID DOCUMENT

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Name of the work: Improvements to Mithra campus(IIIT SKLM Boys campus) at Chinaravpalli (Vill), Etcherla (Mandal), Srikakulam (Dist).

OFFICER INVITING TENDERS :

Administrative Officer, IIIT Srikakulam

1. Tenders are invited on the e-procurement platform for the above -mentioned work from the Contractors / Contracting firms. The details of Tender conditions and terms can be downloaded from the electronic procurement platform of Government of Andhra Pradesh i.e. www.apecurement.gov.in
2. Approximate Estimate Contract value of work : Rs. 2445590/-
3. Contractors would be required to register on the e-Procurement Market place "www.apecurement.gov. in" and submit their bids online. The department will not accept any bid submitted in the paper form.
4. Non refundable Processing fee of Rs 10,000/- to be paid by way of crossed demand draft drawn in favour of Director, IIIT Srikakulam.\
5. a)E.M.D. to be paid for Rs.24455/- (i.e., 1.0% of ECV) drawn in favour of Director, RGU IIIT Srikakulam along with bids and the balance EMD @ 1.5% of Estimate Contract Value / Tender Contract Value whichever is higher is to be paid at the time of concluding agreement.
b)All the participating bidders should pay a Transaction fee of Rs.750/- [(@0.03% of ECV (estimate contract value) with a cap of Rs.10,000/- + service tax @ 15.00%on transaction fee)] to the Managing Director, APTS, Hyderabad by using Credit cards (Any MASTER / VISA Card) issued by any bank or through net banking accounts with ICICI or HDFC Banks as per G.O.Ms.No.13/ IT&C Dept. Dt.07.05.06 with effect for 02.02.2007.

Scanned E.M.D.and Processing fee may be uploaded with the bids and originals must be submitted to the Administrative Officer, IIIT Srikakulam, Prefab Campus,IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM either personally or through courier or by post and the receipt of the same within the stipulated time shall be the responsibility of the tenderer. Failure to furnish the original DD towards EMD and DD for Processing fee before the time will entail rejection of bid and blacklisting.

6. Period of completion of work 90 days.
7. The tenderers can view/ down load the tender documents from the 'e' market place.
8. Form of contract – Lump sum contract.
9. Class of Contractors eligible is as given below:
Eligible class of contractor as per G.O. Ms. No:

Prospect bidder should be registered in the relevant class of contractors.

Time schedule of various tender related events

Bid calling date	07.04.2018
Bid Documents Downloading Start date	07.04.2018
Pre Bid Meeting Date	16.04.2018 at 11:00AM
Bid Document Downloading End Date	24.04.2018 till 05:00 PM
Last date for uploading of online documents	24.04.2018 at 05:30 PM.
Last date for Hard Copies submission of EMD, Document Fee, Pre-qualification documents and other necessary documents. (scanned copies)	25.04.2018 at 05:00 PM
Pre-qualification & Technical Bid opening date/time	26.04.2018 at 10:00 AM.
Price Bid opening date/time	26 .04.2018 at 10:30 AM
Contact person	Administrative Officer, IIIT Srikakulam
Reference No	Ref. No: IIIT SKLM/RGUKT-AP/E-Proc/Works/T13 /2018

Note: The dates stipulated above are firm and under no circumstances they will be relaxed unless otherwise extended by an official notification or happen to be Public Holidays.

CLARIFICATIONS:

- i. Queries if any can be clarified in the Pre-Bid meeting which is scheduled on 16/04/2018 at 11am seminar hall, Prefab campus, IIIT-NUZVID. The bidders are requested to submit the queries in following format on official letter head of the company, on the date of pre-bid meeting.

S. No.	Page No. (Tender Ref.)	Clause (Tender Ref.)	Description (Tender Ref.)	Query

- ii. The addendum/corrigendum if any shall be published on RGUKT-AP website i.e. www.rgukt.in as well as on e-procurement platform <https://tender.apecurement.gov.in>.
- iii. The Bidders are requested to submit the bids after issue of clarifications duly considering the changes made if any. Bidders are totally responsible for incorporating/complying the changes/ amendments made by IIIT Srikakulam, RGUKT-AP.

10. Procedure for submission of Tenders :

- a. Tenderers need to contact Administrative Officer, IIIT Srikakulam for information on e-Procurement.
- b. Tenderers need to register on the electronic procurement market place of Government of Andhra Pradesh i.e., “www.apecurement.gov.in”. On registration on the e-Procurement market place they will be provided with a user id and password by the system through which they can submit their tenders online.

- c. While registering on the e-procurement market Place, tenderers need to scan and upload the required documents as per the Tender requirements onto their profile.

Such uploaded documents pertaining to Technical Bid need to be attached to the tender while submitting the tenders online. The original DD towards EMD and processing fee should be submitted to the Administrative Officer, IIIT Srikakulam, Prefab Campus, IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM

11. Qualification Requirements: To qualify for consideration of award of the contract each tenderer should fulfill the following criteria;

- a. The details and certificates are to be furnished as per the Proforma available in the tender schedules.
- b. The contractor shall furnish a copy of valid GST registration with Commercial Tax department and latest Commercial Taxes Clearance Certificate.
- c. The contractor should furnish copy of permanent account number (PAN) and copy of latest Income Tax returns submitted along with proof of receipt etc..
- d. The Contractor should submit details of existing Commitments of works as per the Proforma available in the tender schedules.
- e. The bidder should have satisfactorily completed similar nature of works of value not less than Rs. 40 lakhs as a prime contractor in the same name and style in any one year during the financial years 2015-2016 to 2017-2018 updated to 2017-2018 price level. GPA holder's experience shall not be taken into account. The bidder should enclose certificate issued by the Engineer-in-Charge of the State/Central Government Departments/State Government undertakings and Central Government undertakings not below the rank of Executive Engineer or equivalent and countersigned by the Officer of the rank of Managing Director or equivalent.
- f. Availability of the key technical personal with adequate experience as per clause 6 of conditions of contract as per statement - I.
- g. Non refundable Processing fee of Rs.10000/- to be paid by way of crossed demand draft drawn in favour of Director, IIIT Srikakulam.
- h. Transaction fee of Rs.750/- [(@0.03% of ECV (estimate contract value) with a cap of Rs.10,000/- + service tax @ 15.00%on transaction fee)] shall be payable to the Managing Director, APTS, Hyderabad in the manner mentioned at 5(b) above.
- i. EMD for Rs.24455/- in of favour of The Director, IIIT Srikakulam to be valid for 6Months from the date of NIT.
- j. Information on Litigation history as per Statement – II, The tenderer should submit the particulars preferably in the format specified in the tender schedule along with necessary certificates.
- k. 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

- l. Even while 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 under clause 60 (a) of PS to APSS.
- m. The Tenderer should submit signed undertaking of tender online.
- n. The bidder should have executed the minimum quantities of items of work as given below in any one year during the financial years for Similar nature of works 2015-2016 to 2016-2017. The bidder should enclose certificate issued by the Engineer-in-Charge of the State/Central Government Departments/State Government undertakings and Central Government undertakings not below the rank of Executive Engineer or equivalent and countersigned by the Officer of the rank of Managing Director or equivalent.

Sl.No	Description of item	Quantity
1	Earth Work Item	
2	R.R Masonry or C.R.S Masonry or Brick Masonry or combined quantity	
3	PCC or VCC or RCC or VRCC or combined quantity	
4	Plastering of any thickness (Combined quantity)	
5	Shahabad or Granite or Marble or Ceramic flooring or combined quantity	
6	Ms Safety Grills for Balconies, windows and Elevation Ms Ornamental works etc...	

The bidder should submit the particulars invariably in the prescribed format specified in the bid document along with necessary certificates, failing which his bid shall be treated as incomplete and summarily rejected.

- o. The bidder should further demonstrate:
 - (i) Availability (either owned or leased) of the following key and critical equipment.

Sl.No	Equipment type and characteristics	Minimum Nos. required
1	Steel centering	
2	Pin vibrators	
3	Pan vibrators	
4	Weigh batchers	
5	Concrete mixers	

6	QC Lab	
7.	Static Weight Roller	
8.	Welding machines	
9	Grinding machines	
10	Cutting Machines	

The bidder has to submit either a certificate issued by the Executive Engineer or a declaration on non judicial stamp paper worth of Rs 100/- as prescribed in Statement - V along with sufficient proof of document in support of owning such as invoice/Certificate of registration by competent authority in support of the critical equipment.

Note: The major equipment to attain the completion of works in accordance with the prescribed construction schedule is to be shown in the above table.

12. Procedure for Tender Submission

- a. The Tenderers who are desirous of participating in e-procurement shall submit their Technical bids, price bids etc., in the Standard formats prescribed in the Tender documents, displayed at e-market place. The tenderers should upload the scanned copies of documents in support of their Technical bids. The bidders shall sign on all the statements, documents, certificates, uploaded by them, owning responsibility for their correctness / authenticity.
- b. After uploading the Technical bid / Price bid, the original Demand Drafts in respect of Processing fee and EMD (except the Price bid / offer) are to be submitted by the tenderer to the Administrative Officer, IIIT Srikakulam, Prefab Campus, IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM
- c. The Corporation will not hold any risk and responsibility for the loss in transit during uploading of the scanned document, for the invisibility of the scanned document online, and any other problem(s) encountered by the Tenderers while submitting his bids online.
- d. The Tenderers shall authenticate the bid with his digital certificate for submitting the bid electronically on e-Procurement platform and the bids not authenticated by digital certificate of the bidder will not be accepted on the e-Procurement platform.

13. General Terms & Conditions

Officer inviting tenders : Administrative Officer, IIIT Srikakulam.

- a. **Tenders are invited on the e-procurement platform for the above mentioned work from the contractors / contract in firms eligible as registered with state govt.,**
- b. Approximate estimated contract value of work: Rs.2445590/-

- c. a) Processing fee: A Demand Draft (non-refundable) for Rs.10000/- in favour of Director, IIIT Srikakulam. The Processing fee once received will not be refunded under any circumstances nor adjusted for other works or subsequent calls or on any other account.
- b) All the participating tenderers should pay a Transaction fee of Rs.750 [(@0.03% of ECV (estimate contract value) with a cap of Rs.10,000/- + service tax @ 15.00%on transaction fee)] shall be payable to the Managing Director, APTS, Hyderabad in the manner mentioned at 5(b) above.
- d. a) E.M.D. for Rs.24455/-(i.e.1 % of ECV) drawn in favor of Director, RGU IIIT, Srikakulam Scanned Processing fee and E.M.D. may be uploaded with the tenders and originals must be submitted to the Administrative Officer, IIIT Srikakulam, Prefab Campus,IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM.Failure to furnish the original DDs towards EMD and Processing fee before price bid opening date will entail rejection of bid and blacklisting.
- e. Period of completion of work: 90 days
- f. Tender Schedules: Tender schedules can be downloaded from the Web site "www.eprocurement.gov.in"
- g. Form of Contract: Lump sum contract.
- h. Class of contractor eligible : Class-II as per Go.Ms No.178 Date: 27/9/1997 or Class-III as per Go.Ms No. 132 Date: 11/08/1999 or Class-IV (GUNTUR CIRCLE) as per Go.Ms No. 94 Date: 01/07/2003.
- i. List of Documents to be uploaded are given in Documents details with self attestation)
- 14. The technical bid evaluation of the tenderers will be done on the certificates /documents uploaded through online only towards qualification criteria furnished by them.
- 15. After uploading the Technical bid / Price bid, the original Demand Drafts in respect of Processing fee and EMD (except the Price bid / offer) are to be submitted by the bidder to the Administrative Officer, IIIT Srikakulam, Prefab Campus,IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM
- 16. The tenderer is subject to be disqualified, 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 completion of the works, litigation history and or financial failures and or participated in the previous tendering for the same work and has quoted unreasonable high bid price.
- 17. Even while 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 as per clause 60(a) of PS to APDSS and his EMD will be forfeited.
- 18. Any other condition regarding receipt of tenders in conventional method appearing in the tender documents may please be treated as not applicable.

19. The contractors are requested to upload the information's in Zip format preferably.
20. Transaction fees: A transaction fee at 0.10% of the estimate contract value of the work towards service charges has to be paid by successful bidder at the time of concluding agreement in the form of Demand draft as follows in favour of :
 - 1) Managing Director, APTS, Rs.____/- (@ 0.04% of estimate contract value with a cap of Rs.10,000/-)
 - 2) Director RGUKT IIIT Srikakulam Rs.____/-, @ 0.06% of estimate contract value)

IMPORTANT NOTE :

After uploading the Technical bid / Price bid, the original Demand Drafts in respect of Processing fee and EMD are to be submitted by the bidder to the Administrative Officer, IIIT Srikakulam, Prefab Campus, IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM

INSTRUCTIONS TO TENDERERS

A - GENERAL

Name of the Work : Improvements to Mithra campus(IIIT SKLM Boys campus)
at Chinaravpalli (Vill), Etcherla (Mandal), Srikakulam (Dist).

Scope of work : Civil Works

- a) ECV put to tender. : Rs.2445590/-
- b) Period of completion. : 90 Days
- c) SSR adopted : Common SSR of 2017-18
- d) Rates adopted for
 - 1. Cement : Rs. 4800/-
 - 2. Fe 500 : Rs:34500/-
 - 3. MS 250 : Rs:36000/-
 - 4. MS Angles : Rs:35500/-
 - 5. MS Flats : Rs:36500/-

Allowances

Agency Allowance - ____%

- g) Seigniorage Charges : As per Government Orders issued from time to time.
(As per tender condition No.98)
- h) Goods and Services Tax (GST). 12% (As per tender condition No.99)

The Administrative Officer, IIIT Srikakulam invites tenders for the above works vide Tender Notice No. IIIT SKLM/RGUKT-AP/E- Proc/Works/T13 /2018

- 1.1 After uploading the Technical bid / Price bid, the original Demand Drafts in respect of Processing fee, and EMD (except the Price bid / offer) are to be submitted by the tenderer to the Administrative Officer, IIIT Srikakulam, Prefab Campus, IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM. The Institute shall not hold any risk on account of postal delay. Similarly, if any of the certificates, documents, etc., furnished by the tenderer are found to be false / fabricated / bogus, the tenderer will be disqualified, blacklisted, action will be initiated as deemed fit and the EMD will be forfeited. The Institute will not hold any risk and responsibility for the loss in transit during uploading of the scanned document, for the invisibility of the scanned document online, and any other problem(s) encountered by the Tenderers while submitting his bids online.
- 1.2 The successful tenderer is expected to complete the work within the time period specified in the Tender Notice.
- 1.3 The successful (L1) Tenderer shall furnish the hard copies of the all the documents/Certificates/statements up loaded by him at the time of concluding agreement. The hard copies should be attested by self /gazetted.

2. Firms Eligible to Tender:

2.1 The Firms who

- i) Possess the valid registration in the class and category mentioned in the Tender Notice and satisfy all the conditions therein are the eligible tenderers.
- ii) Are not blacklisted or debarred or suspended by the Government for whatever the reason, prohibiting them not to continue in the contracting business are the eligible tenderers.
- iii) Have complied with the eligibility criteria specified in the Tender Notice are the eligible tenderers.

2.2 Firms Ineligible to Tender:

- i) A retired officer of the Govt. of AP or Govt. of India executing works is disqualified from tendering for a period of two years from the date of retirement without the prior permission of the Government.
- ii) The Tenderer who has employed any retired officer as mentioned above shall be considered as an ineligible tenderer.
- iii) The contractor himself or any of his employees is found to be Gazette Officer who retired from Government Service and had not obtained permission from the Government for accepting the contractor's employment within a period of 2 years from the date of his retirement.
- iv) The Contractor or any of his employees is found at any time after award of contract, to be such a person who had not obtained the permission of the Government as aforesaid before submission of the tender or engagement in the Contractor's service.
- v) Contractor shall not be eligible to tender for works in the division / circle where any of his near relatives are employed in the rank of Assistant Engineer or Assistant Executive Engineers and above on the Engineering side and Divisional Accounts Officer and above on the administrative side. The Contractor shall intimate the names of persons who are working with him in any capacity or are subsequently employed. He shall also furnish a list of Gazette /Non-Gazette, State Government Employees related to him. Failure to furnish such information tenderer is liable to be removed from the list of approved contractors and his contract is liable for cancellation.

Note: Near relatives include

- 1. Sons, step sons, daughters, and stepdaughters.
- 2. Son-in-law, and daughter-in-law.
- 3. Brother-in-law, and sister-in-law.
- 4. Brothers and Sisters.
- 5. Father and Mother.
- 6. Wife / Husband.
- 7. Father-in-law and Mother-in-law
- 8. Nephews, nieces, uncle and aunts
- 9. Cousins and

10. Any person residing with or dependent on the contractor.

3. Qualification data of the Tenderers

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

- a) Check slip to accompany the tender (in Annexure-I).

Attested copies of documents relating to the Registration of the firm, Registration as Civil Contractor, Partnership deed, Articles of Association, Commercial Tax Registration (GST), Permanent Account Number with latest IT returns submitted and proof of receipt etc.

Note: The Partnership firms, which are registered as Contractors shall intimate the change in partnership deed, if any as per G.O.Ms.No.58, I & CAD dated 23-04-2002 within one month of such change. Failure to notify the change to the registration authority in time will entail the firms to forfeit their registration and their tender will be rejected. The intimation of change of partners if any and the acceptance by the Registration authority may be enclosed.

- b) availability of key personnel for administration / site management and execution viz., technical personnel required for the work (Statement I);
c) Information regarding any litigation, with Government during the last five years, in which the Tenderer is involved in (Statement II);

Note : The tenderer shall sign all the statements /documents and certificates up loaded by him owning the responsibility for their correctness/ authenticity.

- 3.2 a. Tenders from Joint Ventures are not accepted.

b. Contractors against whom Vigilance / disciplinary / blacklisting cases are pending in the Corporation are not entitled to participate in the tender for the above work.

3.3 QUALIFICATION CRITERIA FOR OPENING OF THE PRICE BID.

To qualify for opening the price Bid, each contractor / firm

- i. Should have valid GST Registration with Commercial Tax department and latest Commercial Tax clearance certificate. (Govt. of AP Only).
- ii. Should furnish copy of Permanent Account Number (PAN) card and copy of latest Income Tax returns submitted along with proof of receipt etc..
- iii. Availability of the key technical personal with adequate experience as per clause 6.2 of conditions of contract in Statement - I.
- iv. Copy of Registration as mentioned in Tender Notice
- v. Information on Litigation history in which tenderer is involved if any.
- vi. Non refundable Processing fee of Rs.10000/- to be paid by way of crossed demand draft drawn in favour of Director, IIIT Srikakulam.
- vii. All the participating bidders should pay a Transaction fee of Rs.750/-[(@0.03% of ECV (estimate contract value) with a cap of Rs.10, 000/- + service tax @ 15.00%on transaction fee)] shall be payable to the Managing Director, APTS, Hyderabad in the manner mentioned at 5(b) above.
- viii. EMD in the shape of DD for Rs.10920/-issued by any Nationalized Bank/scheduled bank in favor Director, RGU IIIT, Srikakulam to be valid for 6 Months from the date of NIT.
- ix. Signed undertaking of tender

The bidder should submit the particulars preferably in the format specified in the tender schedule along with necessary certificates.

Note 1: *Tenders from joint ventures will not be accepted.*

Note 2 : Contractors against whom Vigilance / disciplinary / blacklisting cases are pending in the Corporation are not entitled to participate in the tender for the above work.

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

- 3.4 Even though the tenderers meet the above qualifying criteria, they are liable to be disqualified / debarred / suspended / blacklisted if they have
- Furnished false / fabricated particulars in the forms, statements and /annexure submitted in proof of the qualification requirements and/or
 - 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
 - even while 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 invoking clause 60(a) of PS to APSS.
 - The tender of the contractor will be disqualified along with the forfeiture of E.M.D. and the contractor will be debarred from future tendering for a further period of 2 years in the event of furnishing of false/fraudulent certificates along with the tender.
- 3.5 Tenders with an excess of above 5% of the estimated contract value shall summarily be rejected.
- 3.6 For tenders up to 15% less than the estimated contract value of work, no additional security deposit is required. But for tenders less than 15% of the estimated Contract Value of work, the difference between the tendered amount and 85% of the estimated contract value, shall be paid by the successful tenderer at the time of concluding agreement as an additional security to fulfill the contract through a Bank Guarantee or Demand Draft on a Nationalized Bank / Scheduled bank in the prescribed format valid till completion of the work in all respects
- 3.7
- a) If the percentage quoted by a tenderer is found to be either abnormally high or within the permissible ceiling limits prescribed but under collusion or due to unethical practices adopted at the time of tendering process, such tenders shall be rejected.
 - b) A tenderer submitting a Tender which the tender accepting authority considers excessive and or indicative of insufficient knowledge of current prices or definite attempt of profiteering will render himself liable to be debarred permanently from tendering or for such period as the tender accepting authority may decide. The tenderer overall percentage should be based on the controlled prices for the materials, if any, fixed by the Government or the reasonable prices permissible for the tenderer to charge

a private purchaser under the provisions of clause-6 of the hoarding and profiteering prevention ordinance of 1943 as amended from time to time and on similar principle in regard to labour supervision on the construction.

3.8 **CONDITIONAL TENDER**

Conditional tenders are not accepted. Submission of tender would be construed as acceptance to all the terms and conditions of the tender which include conditions of contract, drawings and accompanying specifications.

4. **One Tender per Tenderer:**

4.1 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.

5. **Cost of Tendering**

5.1 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.

6. **Site Visit**

6.1 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 into a contract, for construction of the work. The costs of visiting the site shall be at the Tenderer's own expenses.

B. TENDER DOCUMENT

7. **Contents of Tender document.**

7.1 One set of Tender document, 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., EMD, Additional Security etc.

Price bid

Bill of Quantities and Price bid.

8. **Clarification on Tender Documents**

8.1 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 Officer will also respond to any request for clarification, received through post.

9. **Amendment to Tender Documents**

9.1 Before the last date for submission of Tenders, the Tender Inviting Officer may modify any of the Contents of the Tender Notice, Tender documents by issuing amendment / Addendum.

- 9.2 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 web site www.apecprocurement.gov.in
- 9.3 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

10. Language of the Tender.
- 10.1 All documents relating to the tender shall be in the English Language only.
11. Documents comprising of the Tender
- 11.1 The bidders who are desirous of participating in e-procurement shall submit their technical bids, price bids etc., in the standard prescribed format in the tender documents, displayed at e market place. The bidders should upload the scanned copies of all the relevant certificates, documents etc., in the e market place in support of their technical bids. The bidders shall sign on all the statements, documents, certificates, uploaded by him, owning responsibility for their correctness/authenticity.
- 11.2 After uploading the technical/price bid, the original DDs towards EMD and processing fee are to be submitted by the tenderer to the Administrative Officer, IIIT Srikakulam, Prefab Campus, IIIT NUZVID , Nuzvid, Pin code:521202 before 25.04.2018 5PM
- 11.3 The technical bids will be opened online by the Administrative officer or his authorized representative at the time and date as specified in the tender documents. All the statements, documents, certificates, DD etc., uploaded by the tenderers will be down loaded for technical evaluation. The clarifications, particulars if any required from the bidders will be obtained in the conventional method by addressing the bidders. The technical bids will be evaluated against the specified parameters/ criteria, same as in the case of conventional tenders and the technically qualified bidders will be identified. The result of technical bid evaluation will be displayed on the e market place, which can be seen by all the bidders who participated in the tenders. The bidder who fulfilled the technical criteria will allow to financial bid opening.
- 11.4 Furnishing of hard copies by the tenderers before opening of the Price bid is dispensed with.
- 11.5 The tenderer shall invariably furnish the original DD towards EMD to the tender inviting authority before opening Price bids either personally or through courier or by post and the receipt of the same within the stipulated time shall be the responsibility of the tenderer. Department will not take any responsibility for any delay or non receipt. Failure to furnish the original DD towards EMD before Price bid opening will entail rejection of bid.
- 11.6 The bidder shall mandatorily pay the transaction fee to MD, APTS, Hyderabad., through the electronic payment gateway.
- 11.7 The successful tenderer shall furnish the original hard copies of all the documents / certificates / statements uploaded by him before concluding agreement.
- 11.8 If any tenderer fails to submit the Original DD for EMD, hard copies of uploaded documents within the stipulated time, the tenderer will be suspended /disqualified from participating in the tenders on e-procurement platform for a period of 12 months from the date of bid submission. The suspension of tenderer shall be automatically enforced by the e-procurement system.
- 11.9 The tenderers shall furnish a declaration in online stating that the soft copies uploaded by them are genuine. Any incorrectness/deviation noticed will be

viewed seriously and apart from canceling the work duly forfeiting the EMD, criminal action will be initiated including suspension of business.

- 11.10 The Bidder shall authenticate the bid with his digital certificate for submitting the bid electronically on e-Procurement Platform and the bids not authenticated by Digital certificate of the bidder will not be accepted on the e-Procurement platform.

12. Bid Offer:

- 12.1 Bill of Quantities called Schedule "A" and the bid offer accompanies the tender document as Volume - II. It shall be explicitly understood that the Tender Inviting Officer 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 Engineer-in-charge or as set forth in the conditions of the contract. The tenderers will have to state clearly their willingness to execute the work at certain specific percentage of excess or less or at par of the ECV indicated at the space provided therein in Schedule 'A'. The tenderer should however quote his lump sum tender based on this schedule of quantities. He should quote his offer as a overall tender percentage. The overall tender percentage should be written both in words and figures. The bid offers i.e., percentage shall be quoted both in figures and words.
- 12.2 The Schedule -A (or Price-bid) contains not only the quantities but also the rates worked out by the Department and the amount for each item and total value of the estimated contract. The tenderer should workout his own rates keeping in view the work, site conditions and quote his overall tender percentage with which he intends to execute the work.
- 12.3 The bid offer shall be for the whole work and not for individual items / part of the work.
- 12.4 All duties, taxes, and other levies payable by the contractor as per State / Central Government rules, shall be included in the tender percentage quoted by the tenderer.
- 12.5 The tendered contract amount as computed based on overall tender percentage is subject to variation during the performance of the Contract in accordance with variation in quantities etc.
- 12.6 A Transaction fee at 0.10% of the estimate contract value of the work towards service charges has to be paid by successful bidder at the time of concluding agreement in the form of Demand draft as follows in favour of :
- 1) Managing Director, APTS, Hyderabad for Rs.970_/- (@ 0.04% of estimate contract value with a cap of Rs.10,000/-)
 - 2) Managing Director, APMSIDC, Hyderabad for Rs.1450/- @ 0.06% of estimate contract value)

13. Validity of Tenders

- 13.1 Tenders shall remain valid for a period of not less than three months from the last date for receipt of Tender specified in NIT.
- 13.2 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.

- 13.3 In exceptional circumstances, prior to expiry of the original time limit, the Tender Inviting Officer may request the bidders 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.

14. Processing fee :

- a) The Tenderer shall furnish, Processing fee of Rs.10000/- in the form of crossed DD in favour of Director, IIIT, Srikakulam.
- b) All the participating bidders should pay a transaction fee of Rs.750/- [(@0.03% of ECV (estimate contract value) with a cap of Rs.10,000/- + service tax @ 15.00%on transaction fee)] shall be payable to the Managing Director, APTS, Hyderabad in the manner mentioned at 5(b) above.

Earnest Money Deposit

- 14.1. The Tenderer shall furnish, Earnest Money Deposit equivalent to 1% of ECV along with hard copies of Tender documents. The DD shall be from a Nationalized Bank/Scheduled Bank in favour of Director, IIIT Srikakulam valid for a period of 6 Months. Xerox copy of the DD is to be scanned and uploaded along with the Bid and the original DD shall be sent to the Administrative Officer, IIIT Srikakulam so as to reach before 3.00 PM on the date of opening of the price bid. Failure to furnish the original DD before 3.00PM on the date of opening of price bid will entail rejection of bid and blacklisting.
 - 14.2. The successful tenderer should however pay the E.M.D. at 2½% on Estimated Contract Value / Tender Contract Value whichever is higher plus the additional EMD for tenders less than 15% of the Estimate Contract Value in accordance with Clause 3.6 at the time of signing the agreement in the shape of crossed Demand Draft on any Nationalized Bank./Scheduled Bank .
 - 14.3. Demand Drafts furnished towards EMD shall be valid for a period of six months from the date of tender notice.
15. Return of E.M.D. to unsuccessful tenderer: The earnest money deposit will be refunded to the unsuccessful tenderer by registered post at the expiry of the period of validity of tender or the entrustment of the work to the successful tenderer whichever is earlier.
16. Return of EMD to successful tenderer
The EMD paid by the successful tenderer at the time of tendering will be discharged when the tenderer has signed the agreement and furnished the required EMD pursuant to Clause 14.2
17. 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.
- 17.1. The E.M.D. shall be forfeited.
 - (a) if the Tenderer withdraws the Tender during the validity period of Tender.
 - (b) in the case of a successful Tenderer, if he fails to sign the Agreement for whatever the reason.
 - 17.2. In consideration of the Engineer-in-charge 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 Corporation in the event of such tenderer either modifying or with-drawing his tender at his instance within the said validity period of three months.

D. SUBMISSION OF TENDERS

18. Submission of Tenders:

- 18.1. The Tenderers who are desirous of participating in e-procurement shall submit their Technical bids, price bids etc., in the Standard formats prescribed in the Tender documents, displayed at e-market place. The Tenderers should upload the scanned copies in support of their Technical bids. The documents are to be uploaded in ZIP format only. The bidders shall sign on all the statements, documents, certificates, uploaded by him, owning responsibility for their correctness / authenticity. The documents uploaded online will only be considered for evaluation.
After uploading the Technical / Price bid, the original Demand Drafts in respect of processing fee, and EMD (except the Price bid / offer) are to be submitted by the bidder to the Administrative Officer, IIIT Srikakulam, Prefab Campus, IIIT Nuzvid, Nuzvid so as to reach before 5.00 PM on the specified date
- 18.2. The IIIT Srikakulam will not hold any risk and responsibility for the loss in transit during uploading of the scanned document, for the invisibility of the scanned document online, and any other problem(s) encountered by the Tenderers while submitting his bids online.
- 18.3. Related certificates, documents etc., duly self attested are to be scanned and uploaded on to the e-procurement platform at www.eprocurement.gov.in in support of items mentioned in clause 3.
- 18.4. Any other condition regarding receipt of tenders in conventional method appearing in Tender document may be treated as Non-applicable.

19. Last date / time for Submission of the Tenders.

- a) Tenders must be submitted online not later than the date and time specified in the Tender Notice / Tender Document. The Engineer-in-charge or his nominee may extend the dates for issue and receipt of Tenders by issuing an amendment in which case all rights and obligations of the Engineer-in-charge and the Tenderers will remain same as previously. **Late Tenders:** Tenders will not be received after the last date / time prescribed in NIT / Tender Document.
- b) Modification to the Tender. Tenderers can modify their Tender online before the last date/time prescribed in Tender Notice / Tender Document and amendments issued, if any. No tender shall be modified after the last date /time of submission of Tenders.
- c) Submission of Tenders: The tenderer shall invariably ensure that the following are uploaded online
 - a) Check slip
 - b) Copy of contractors registration certificate under appropriate class with Government of Andhra Pradesh

- c) Copy of permanent account number (PAN) card and copy of latest Income Tax returns submitted along with proof of receipt..
- d) Copy of GST Registration Certificate from Commercial Tax Department and latest valid Commercial Tax clearance certificate.
- e) The availability of Key personnel in Statement I
- f) The information on litigation history in Statement II
- g) DDs for processing fee and EMD.
- h) Signed under taking of tender.

Note:- Any incorrectness / deviation noticed in the soft copies will be viewed seriously and apart from canceling the tender duly forfeiting the EMD, criminal action will be initiated including suspension of business.

E. TENDER OPENING AND EVALUATION

20. Tender opening

- 20.1. The Technical bids will be opened online by the Engineer-in-charge or his nominee at the time and date as specified in the Notice Inviting Tender. All the Statements, documents, certificates, Demand Draft etc., uploaded by the Tenderers will be downloaded for technical evaluation. The technical bids will be evaluated against the specified parameters / criteria same as in the case of conventional tenders and the technically qualified bidders will be identified. The result of Technical bids evaluation will be displayed on the e-market place, which can be seen by all the tenderers who participated in the Tenders.

21. Clarification on the Technical Bid

- 21.1. The tender opening authority may call upon any tenderer for clarification on the statements, documentary proof relating to the technical bid. The request for clarification and response thereto shall be in writing and it shall be only on the qualification information uploaded online by the tenderer. The clarification called for from the tenderers shall be furnished within the stipulated time, which shall not be more than a week.
- 21.2. The tenderer if so desirous, shall agree in writing to furnish the clarification called for within the stipulated time and, for disqualification and rejection of his tender in the event of failure to do so.

22. Examination of technical Bids and Determination of Responsiveness

- 22.1. The Engineer-in-charge or his nominee will evaluate whether each Tenderer is satisfying the eligibility criteria prescribed in the tender document and declares them as a qualified Tenderer if he satisfies the eligibility criteria.
- 22.2. If any alteration is made by the tenderer in the tender documents, the conditions of the contract, the drawings, specifications or statements / formats or quantities the tender will be rejected.

23. Price Bid Opening

- 23.1. At the specified date and time, the price bids of all the technically qualified bidders will be opened online by the Engineer-in-charge or his nominee and the result will be displayed on the e-market place which can be seen by all the bidders who participated in the Tenders.
- 23.2. The Price Bid of the Unqualified Tenderers will not be opened.

23.2.1. Tenders shall be scrutinized in accordance with the conditions stipulated in the Tender document. In case of any discrepancy of non-adherence to 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 or dispute, the decision taken by the Tender Accepting Authority on tenders shall be final.

24. Evaluation and Comparison of Price Bids

- 24.1. The Engineer-in-charge or his nominee will evaluate and compare the price bids of all the qualified Tenderers.
- 24.2. 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.
- 24.3. 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.

25. Discrepancy in Tender percentage quoted

- 25.1. In case of any discrepancy between the overall tender percentage quoted in words and figures, the percentage quoted in words shall prevail. In case the tenderer has quoted overall tender percentage only in words and not in figures or vice versa, such tender shall be treated as incomplete and rejected.

26. Process to be Confidential

- 26.1. 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.
- 26.2. No Tenderer shall contact the Engineer-in-charge or any authority concerned 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 Administrative Officer, IIIT Srikakulam, it should do so in writing.
- 26.3. 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.
- 26.4. Tender will be finalized by the Engineer-in-charge in accordance with the conditions stipulated in the tender document and in case any discrepancy of non-adherence to the conditions, the same shall be communicated which will be binding both on the tender concluding authority and contractor. In case of

any ambiguity the decision takes by the Engineer-in-charge on tender shall be final.

F. AWARD OF CONTRACT

27. Award Criteria

- 27.1. The Engineer-in-charge or his nominee will award the contract on approval of the tender by competent authority.
- 27.2. The tender accepting 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.

28. Notification of Award and Signing of Agreement

- 28.1. 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. This letter (hereinafter and in the Conditions of Contract called "Letter of Acceptance") will indicate the sum that the IIIT Srikakulam 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").
- 28.2. When a tender is accepted, the concerned tenderer shall attend the office of the Engineer-in-charge on the date fixed in the Letter of acceptance. Upon intimation being given by the Engineer-in-charge, of acceptance of his tender, the tenderers shall make payment of the E.M.D., and additional security deposit wherever needed by way of Demand Draft or unconditional and irrevocable Bank Guarantee obtained from a Nationalized / Scheduled Bank with a validity period of duration of Contract period plus defects liability period of 2 years and sign an agreement in the form prescribed by the department for the due fulfillment of the contract. Failure to attend the Engineer-in-charge office on the date fixed, in the written intimation, to enter into the required agreement shall entail forfeiture of the Earnest Money deposited. The written agreement to be entered into between the contractor and the Engineer-in-charge 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 proper officer authorized to enter into contract.
- 28.3. The successful tenderer has to sign an agreement within a period of 15 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 for black listing the tenderer.

29. Corrupt or Fraudulent Practices

- 29.1. The IIIT Srikakulam requires that the bidders / suppliers / contractors under Institute financed contracts, observe the highest standard of ethics during the procurement and execution of such contracts. In pursuance of this policy, the IIIT Srikakulam

- (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 a IIIT Srikakulam 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 IIIT Srikakulam 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 IIIT Srikakulam 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 a IIIT Srikakulam Contract.
- (d) Furthermore, Tenderers shall be aware of the provisions stated in the General Conditions of Contract.

30. Rights of the IIIT Srikakulam

- 30.1. The Engineer-in-charge reserves the right to reject any or all of the tenders, without assigning any reason whatsoever.
- 30.2. In the event of any dispute regarding any of the tender conditions, the decision of the IIIT Srikakulam shall be final.

FORMS OF TENDER
QUALIFICATION INFORMATION
AND
UNDER TAKING OF TENDERER

QUALIFICATION INFORMATION
CHECKLIST TO ACOMPANY THE TENDER
Documents to be submitted by tenderer on the
E-procurement platform on line

Sl.No	Document to be uploaded to profile	Description to be given	Scanned documents to be uploaded	Page No. (see Note below)
1	2	3	4	5
1	(a) Contractors valid registration under appropriate class and category with Government of Andhra Pradesh (for Civil , PH and Electrical categories) (b) Partnership deed in case of firms & article of association in case of companies	Civil Registration	Yes / No	
2	EMD Paid by way of Online / Challan Generation as per GO MS No. 8 dt. 08.05.2016 to the Account of The Director, RGU IIIT Srikakulam, (A/c No.***** having in Institution Bank, Srikakulam Branch. IFSC Code:- *****, MICR Code : ***** and copy of Bank slip should be scanned will be attached to Uploaded documents.	EMD	Yes / No	
3	Transaction fee through electronic gateway payment	Transaction Fee	Yes / No	
4	Scanned copy of Bid processing fee by way of DD / Net Banking as per GO MS No. 8 dt. 08.05.2016 to the Account of Director, RGU IIIT SRIKAKULAM, (A/c No.***** having in Institution Bank, Srikakulam Branch. IFSC Code:- *****, MICR Code : ***** 96 Hours (4 days) of bid submission close time	Bid processing Fee	Yes / No	
5	Copy of PAN card & proof of submission of latest income tax returns along with proof for the assessment year 2016-17.	Income Tax Documents	Yes / No	
6	Copies of GST registration	GST Documents	Yes / No	
7	Details of Similar nature of works completed as prime contractor (in the same name) during the last Three financial Years for any one financial year in Statement-II with supporting certificates duly issued by the EEs and countersigned by the SE/Higher authorities.	Similar Works	Yes / No	
8	Quantities of work executed as prime contractor (in the same name) in the last 3 financial years for any one financial year in Similar nature of works in Statement-III with supporting certificates duly issued by the EEs and countersigned by the SE/Higher authorities.	Executed Quantities	Yes / No	
9	Availability of key & critical equipment in Statement -V with countersigned by E.E/S.E	Critical Equipment	Yes / No	

10	Declaration on critical equipment on non-judicial stamp paper worth of Rs.100/-	Declaration on critical equipment	Yes / No	
11	Proof of owning quality control laboratory or tie up with an established quality control testing laboratories along with the required equipment as specified in bid document for the works with ECV more than Rs. 200.00 Lakhs	QC Lab	Yes / No	
12	Declaration on quality control laboratory along with required equipments on non-judicial stamp paper worth of Rs. 100/- as per statement-VIII	Declaration on QC Lab	Yes / No	
13	Availability of key personnel along with qualification certificates in Statement-VI	Technical Agents	Yes / No	
14	Statement of existing commitments in ongoing Govt. works along with supporting experience certificates as in Statement- IVA	Existing commitments	Yes / No	
15	Statement of works for which tenders are submitted and likely to be awarded as in Statement IV-B	Works awarded/likely to be awarded	Yes / No	
16	Information on litigation history as in Statement VII	Litigation history	Yes / No	
17	Declaration in online stating that the soft copies uploaded by them are genuine	Undertaking	Yes / No	
18	Self declaration by the bidder in proof of going through all bid conditions (see format below check list)	Declaration	Yes / No	
19	Any other certificates required as per NIT	Any other certificates	Yes / No	
20	List of certificates enclosed	List of certificates enclosed	Yes / No	
21	The bidder at his own cost & risk shall obtain address of this site from the bid authority and visit the site for preparing bid. The bidder shall upload the photograph of site visit site.	site visit	Yes/No	

- Note:
1. Please upload documents in ZIP format with suitable description as defined above.
 2. The scanned documents shall be legible failing which they will not be considered.
 3. Shall sign on all statements, documents, certificates uploaded owning responsibility for their correctness / authenticity.
 4. All the statements copies of the certificates, documents etc., enclosed to the Technical bid shall be given page numbers on the right corner of each certificate, which shall be indicated in column (5) against each item.

STATEMENT

Availability of Key Personnel

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

Sl. No	Name	Designation	Qualification	Total Experience	Working with the Tenderer since.
1	2	3	4	5	6

Signature of the Tenderer

STATEMENT

Information on litigation history in which Tenderer is the Petitioner.

S. No	Case No. / Year	Court where filed.	Subject Matter / Prayer in the case.	Respondents i.e., SE / CE	Present Stage.
1	2	3	4	5	6

Signature of the Tenderer

UNDERTAKING OF TENDERER

Date:

To

The Administrative Officer,
IIIT Srikakulam.

Sir,

I/We, ____ do hereby tender and if this tender be accepted, under take to execute the following work “ Improvements to Mithra campus(IIIT SKLM Boys campus) at Chinaravpalli (Vil), Etcherla (Mandal), Srikakulam (Dist).” , as shown in the drawings and described in the specifications available on online and also in the office of the Engineer-in-charge 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 as quoted online or such other sum as may be arrived under the clause of the standard preliminary specifications relating to “Payment on lump-sum basis or by final measurement at unit rates”

I/WE have also quoted percentage excess or less on E.C.V., in Schedule ‘A’, annexed (in words and figures) for which I/We agree to execute the work when the lump sum payment under the terms of the agreement is varied by payment on measurement quantities.

I/WE have quoted Percentage excess or less on E.C.V., in Schedule ‘A’ both in words & figures. In case of any discrepancy between the Percentage excess or less on E.C.V., in words and figures, the rates quoted words only shall prevail.

I/WE agreed to keep the offer in this tender valid a period of Nine 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 IIIT Srikakulam.

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 have read the A.P.S.S. and the preliminary specifications therein and the A.P.S.S. addenda volume 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 IIIT Srikakulam 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 tender a crossed Demand Draft towards Earnest Money Deposit not to bear any interest

I/WE enclosed to my/our tender a crossed Demand Draft towards Processing fee which is non-refundable.

I/WE shall not assign the contract or sublet any portion of the same. In case if it becomes necessary such subletting with the permission of the Engineer-in-charge shall be limited to (1) Labour contract (2) Material contract (3) Transport contract (4) Engaging specialists for special items 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 IIIT Srikakulam as security for the due fulfillment of this contract. If upon written intimation to me/us by the Engineer-in-charge 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 Engineer-in-charge 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- 14.2 of the tender conditions, 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 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 wherein 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 Institute 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 authorized to enter into contract on behalf of IIIT Srikakulam.

I/WE agree to pay the Transaction fee at 0.04% or as amended from time to time on Estimated contract value of the work through a Demand Draft drawn in favour of M/s A.P.T.S. Hyderabad at the time of conclusion of Agreement.

I/WE agree to pay the Service charges at 0.06% or as amended from time to time on Estimated Contract Value of the work through a Demand Draft drawn in favour of Director, RGU IIIT Srikakulam at the time of conclusion of Agreement.

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 (eg) Reinforced cement concrete work.

Name 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 IIIT Srikakulam, 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 Andhra Pradesh 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 at IIIT Srikakulam.
- (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 all the 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/We will pay an additional security deposit in terms of conditions, the difference between 85% of ECV and my/our tender amount, in case if my / our offer is less than 15% as per clause 3.6
- (5) I/WE hereby declare that I am/we are accepting to reject my tender in terms of condition, if my /our offer is more than 5% of ECV as per clause 3.5.
- (6) I/WE hereby declare that I am/We are accepting for the defect liability period as 24 months instead of 12 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 Engineer-in-Charge. 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/material and the land for borrow area. My/our quoted percentage excess or less on ECV., are inclusive of the land so arranged and I/We will hand over the land so arranged for disposal of soil/material to the Institute after completion of work.
- (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 department / Corporation 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 IIIT Srikakulam against us, if it is found that the statements, documents, certificates produced by us are false / fabricated.

Address of the Tenderer :

Phone No.:

Fax No.:

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 corporation it shall be signed by a duly authorized officer who shall produce with his tender satisfactory evidence of his authorization. Such tendering corporation 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. Works have their normal meaning under the language of the contract unless specifically defined. The Engineer-in-charge 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. Engineer-in-Charge's Decisions
 - 2.1. Except where otherwise specifically stated, the Engineer-in-charge, IIIT Srikakulam will decide the contractual matters between the Institute and the Contractor in the role representing the Department.
3. Delegation
 - 3.1. The Engineer-in-charge may delegate any of his duties and responsibilities to other officers and may cancel any delegation by an official order issued.
4. Communications
 - 4.1. 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. Other Contractors
 - 5.1. The Contractor shall cooperate and share the Site with other contractors, Public authorities, utilities, and the Department. The Contractor shall also provide facilities and services for them as directed by the Engineer-in-charge
6. Personnel
 - 6.1. 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 Engineer-in-charge. The Engineer-in-charge 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.
 - 6.2. Schedule of Key Personnel:

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

Cost of work (Technical sanction amount)	Qualification of Technical Staff
1	2
From Rs.34,300/- to Rs.1 Lakh	One I.T.I. candidate
Above Rs.1.00 lakh up to Rs.15.00 lakhs	One diploma holder
Above Rs.15.00 lakh up to Rs.50.00 lakhs	One Graduate Engineer
Above Rs.50.00 lakh upto Rs.100.00 lakhs	One Graduate Engineer and One Diploma holder
Above Rs. 100.00 Lakhs	Two Graduate Engineers
Above Rs. 500.00 lakhs upto Rs. 1000.00 Lakhs	Two Graduate Engineer and One Diploma holder
Above Rs. 1000.00 lakhs and Above	Three Graduate Engineer and Two Diploma holders & Two Electrical Engineers
Above Rs. 5000.00 lakhs and above	Six Graduate Engineers and Two Electrical Engineers

6.3 Employment of technical personnel shall be with reference to the estimate cost of work put to tender.

6.4 In case the contractor himself is a Diploma holder / Graduate Engineer no agent need to be appointed to supervise works costing up to Rs.5.00 lakhs. Even if the contractor is himself a technically qualified person, he shall employ technical staff on the scale prescribed for supervising works when more than one work is undertaken and if they are beyond a radius of 5 Kms. One or more works within a radius of say 5 Km. shall be treated as a single work for the purpose of employment of technical staff.

6.5 The appointment of technical staff shall be on full time basis for which they shall be reimbursed staff wages as below:

I.T.I Candidate - Rs. 12,000/- per month. Diploma Engineer -Rs. 16,500/- per month. Graduate Engineer-Rs. 22,050/- per month. The Technical staff shall be available at work site for supervising the work including quality checking of all items from time to time. Failure to employ the required technical personnel by the contractor the amounts will be recovered at the above rates from the contractor.

6.6 The Engineer-in-charge is the sole judge (a) to decide whether qualified technical staff is actually supervising the work and (b) to decide the actual period of absence of such staff which requires the above recovery to be enforced and his decision is final and binding on the contractor.

6.7 The technical agents appointed by the contractor shall have to maintain properly all the records required by the department under safe custody at site, like checklists, calibration registers/records, Quality Test Registers, Test reports file, site order book, etc. and make signatures at appropriate places towards proof of verifications, conduction of tests, compliance to instructions etc.

- 6.8 The technical personnel should be on full time and available at site whenever required by Engineer-in-Charge to take instructions.
- 6.9 The names of the technical personnel to be employed by the contractor should be furnished in the statement enclosed separately.
- 6.10 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.
- 6.11 If the contractor fails to employ technical personnel the work will be suspended or department will engage a technical personnel and recover the cost at penal rate of two times thereof from the contractor.
- 6.12 If the Engineer-in-charge 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

7. Contractor's Risks

- 7.1. All risks of loss of 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.

8. Insurance:

All risks of loss of 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.

9. Deleted

as per G.O Ms No 5, Dt:05.03.2014 of Finance (W & P) Department

10. Site Inspections

- 10.1 The contractor should inspect the site and also proposed quarries of choice for materials source of water and quote his percentage including quarrying, conveyance and all other charges etc.
- 10.2 The responsibility for arranging the land for borrow area rests with the Contractor and no separate payment will be made for procurement or otherwise. The contractor's quoted percentage will be inclusive of land cost.

11. Contractor to Construct the Works

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

12. Diversion of streams / Vagus / Drains.

- 12.1 The contractor shall at all times carry out construction of cross drainage works in a manner creating least interference to the natural flow of water while consistent with the satisfactory execution of work. A temporary diversion shall be formed by the contractor at his cost where necessary. No extra payment shall be made for this work.
- 12.2 No separate payment for bailing out of sub-soils, water drainage or locked up rain water for diversion , shoring , foundations , bailing of pumping water either from excavation soils from foundations or such other incidental will be paid. The percentage to be quoted by the contractor are for the finished item of work in situ and including all the incidental charges. The borrow pits are also

to be dewatered by the contractor himself at his expense, if that should be found necessary.

- 12.3 The work of diversion arrangements should be carefully planned and prepared by the contractor and forwarded to the Engineer-in-charge technically substantiating the proposals and approval of the Engineer-in-charge obtained for execution.
- 12.4 The contractor has to arrange for bailing out water, protection to the work in progress and the portion of works already completed and safety measures for men and materials and all necessary arrangements to complete the work.
- 12.5 All the arrangements so required should be carried out and maintained at the cost of the contractor and no separate or additional payments is admissible..
- 12.6 Coffor Dams.
Necessary Coffor Dams and ring bunds have to be constructed at the cost of contractor and same are to be removed after the completion of the work. The contractor has to quote his percentage keeping the above in view.

13. Power Supply

- 13.1 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 Department for the cost of power consumed by him.
- 13.2 If the power supplied by the IIIT Srikakulam, the contractor will pay the bills to IIIT Srikakulam for the cost of power consumed by him.
- 13.3 The contractor shall satisfy all the conditions and rules required as per Indian Electricity Act 1910 and under Rule-45(I) of the Indian Electricity Rules, 1956 as amended from time to time and other pertinent rules.
- 13.4 The power shall be used for bonfire departmental work only.
- 13.5 The contractor shall at all times during the currency of the contract, comply fully with all existing Acts, regulations and bylaws including all statutory amendments and reenactment's of state or central govt., and other local authorities and any other enactment's, notification and acts that may be passed in future either by the state or the central government or local authority including Indian workmen's compensation Act- 1923, Control labour (Regulation and Abolition) Act- 1970, The child labour prohibition and regulation Act-1986 and equal remuneration Act- 1976, Factories Act, minimum wage Act- 1948, provident fund regulations, Employees provident fund Act- 1952 schedules made under the same Act. The buildings and other construction workers (Regulation of employment and condition of service) Act- 1996, The Cess Act- 1996 and also applicable labour regulations, health and sanitary arrangement for workmen, insurance and other benefit and shall keep department indemnified in case any action is commenced by competent authorities for contravention by the contractor.
- 13.6 The electrical contractor has to keep his license in currency till the work is completed. If the license is suspended during the period in which the work is in progress the contract will be terminated and awarded to some other agency recovering the extra cost if any.
- 13.7 The materials used in the work should be as per the list of materials enclosed. The department reserves the right to insist upon using any of the materials from this list of approved materials.
- 13.8 The work shall be carried out strictly in conformity with (i) code of practice for Electrical wiring and fittings in Government Buildings, (ii) The Indian standard specification (iii) The Department specification. If the work carried out does not comply with the code of practice and the Departmental specifications and if the workmanship is unsatisfactory it will be binding on the contractor to

redo the job without any extra cost and pay penalty as decided by the Department towards inconvenience caused if any.

- 13.9 The work should be carried out under the direct supervision of persons holding a certificate of competency for the type of work involved.
- 13.10 After completion of work a plan of building installation should be prepared and furnished indicating the location of various main and sub boards and also the fittings together with a circuit diagram duly numbered (in the diagram). The final bill will not be paid till the above plan and the diagram is submitted and approved after verification. Such completion drawings shall be signed by the licensed electrical contractor through whom the work is executed.
- 13.11 Lugs should be provided for all earth connections.
- 13.12 The contractor himself should arrange for the transportation of men and materials to the work spot.
- 13.13 Concreting to the pole and providing independent earthing should be done in presence of Departmental staff.
- 13.14 On completion of the Electrical Installation a certificate shall be furnished by the Contractor countersigned by a licensed supervisor that under direct supervision the installation was carried out. This certificate shall be in the prescribed form as required by the local supply authority. The contractor shall be responsible for getting the Electrical Installation inspected and approved by the local authority concerned.
- 13.15 The contractor shall pay for any inspection fees and for permits required for the installation of the work wherever necessary. The IIIT Srikakulam shall arrange only for payment of service connection charges and any other security deposit for getting electrical supply. On completion of the work, the contractor shall obtain and deliver to the IIIT Srikakulam, certificates of final inspection and approval by the local Electric Authority as may require. The IIIT Srikakulam shall have full powers to require the materials or work to be tested by an independent agency at the Electrical contractor's expense in order to prove their soundness and adequacy.
- 13.16 Contractor shall provide everything necessary for the proper execution of works according to the intent and meaning of the drawings, specifications, schedule of quantities. Any discrepancy in the documents shall be brought to the notice of the IIIT Srikakulam and got clarified prior to taking up the installation.
- 13.17 **Materials and Workmanship:**
All materials and workmanship shall conform to the specifications, relevant IS standards and code of practice and comply with APSEB/CEIG requirements as the case may be. Any work that is not up to the standards shall be dismantled and reconstructed by the contractor to the satisfaction of the IIIT Srikakulam authorities.
- 13.18 **Liaison Work:**
The Contractor shall be responsible for all liaison work with Electricity Board/CEIG
- 13.19 "The Civil Contractor shall get all the electrical works done only through the licensed electrical contractors / permit holders as registered with or licensed by A.P.S. Electrical licensing Board. A copy of such valid license / permit should be furnished by successful Civil Contractor, at the time of concluding agreement, for each work separately. The commencement and completion certificate and drawings for each work issued by the electrical licensed Contractor / Permit holder should be furnished by Civil Contractor, for releasing payment of electrical work".

14. 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.

15. 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 Institute. 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.

16. The works to be Completed by the Intended Completion Date

16.1 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 the Engineer-in-Charge, and complete the work by the Intended Completion Date.

17. Discoveries

17.1 Anything of historical or other interest or of significant value unexpectedly discovered on the Site is the property of the IIIT Srikakulam. The Contractor is to notify the Engineer-in-charge of such discoveries and carry out the Engineer-in-Charge's instructions for dealing with them.

18. Possession of the Site

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

19. Access to the Site

19.1 The Contractor shall provide the Engineer-in-Charge and any person authorized by the Engineer-in-Charge, 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.

20. Instructions

20.1 The Contractor shall carry out all instructions of the Engineer-in-charge and comply with all the applicable local laws where the Site is located.

21. Settlement of disputes

21.1 If any dispute or difference of any kind whatsoever arises between the IIIT Srikakulam 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 Engineer-in-charge 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 Engineer-in-Charge the Contractor shall promptly proceed without delay to comply with such notice of decision.

21.2 If the Engineer-in-Charge 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 Engineer-in-Charge, the Contractor may within thirty days after receiving the notice of decision appeal to the IIIT Srikakulam which shall offer an opportunity to the contractor to be heard and to offer evidence in support of his appeal, the IIIT Srikakulam 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 IIIT Srikakulam 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 IIIT Srikakulam 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 IIIT Srikakulam 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:-

21.3 SETTLEMENT OF CLAIMS:

Settlement of claims for Rs.50,000/- and below by Arbitration.

All disputes or difference arising of or relating to the Contract shall be referred to the adjudication as follows:

1. Claims up to a value of Rupees 10,000/-.

Director, IIIT Srikakulam

2. Claims above Rs.10, 000/- and up to Rupees 50,000/-.

Director, IIIT Srikakulam

The arbitration shall be conducted in accordance with the provisions of Indian Arbitration and Conciliation Act 1996 or any statutory modification thereof.

The arbitrator shall state his reasons in passing the award.

3. Claims above Rs.50, 000/-.

All claims of above Rs.50,000/- are to be settled by a Civil Court of competent jurisdiction at Srikakulam by way of civil suit and not by arbitration.

The contractor shall make a reference for adjudication under this clause within six months from the date of intimating the contractor of the preparation of final bill or his having accepted payment whichever is earlier.

B. TIME FOR COMPLETION

22. Program

- 22.1 The total period of completion is 90 days from the date of entering with agreement to proceed including rainy season.
- 22.2 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 following rate of progress and proportionate value of work done from time to time as will be indicated by the Engineer-in-charge's Certificate for the value of work done and completion of mile-stones will be required.
- 22.3 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 signing the agreement but not the date of handing over the site. 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.

Milestone dates :

Mile stone- 1 Completion of the Work

- 22.4 Detailed programme in terms of collection of necessary materials and labour and in terms of finished items of work, to confirmation of the above rate of progress shall be prepared by the contractor and got approved by the Engineer-in-charge concerned and which shall be strictly adhered to. This programme of work shall be given based on PERT /CPM charts for works, where ECV exceeds Rs.100 lakhs, in the approved format.
- 22.5 After signing the agreement, the contractor shall forthwith begin the work, shall regularly and continuously proceed with them. Work programme of achieving of milestones (statement) should be submitted from time to time.
- 22.6 The contractor shall commence the works on site as specified under condition 24.1 to 24.3 above after the receipt by him of a written order to this effect from the Engineer-in-charge and shall proceed with the same with due expedition and without delay, except as may be expressly sanctioned or ordered by the Engineer-in-charge or his nominee, or be wholly beyond the contractor's control.
- 22.7 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 Engineer-in-charge or his nominee will, with the Engineer-in-charge's 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 Engineer-in-charge or his nominee, may 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 maybe ; if the contractor suffers delay or incurs cost from failure on the part of the Engineer-in-charge or his nominee to give possession in accordance with the terms of this clause, the Engineer-in-charge or his nominee shall grant an extension of time for the completion of works.
- 22.8 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.

- 22.9 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.

22.10 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 Engineer-in-charge or by the office competent to sanction the extension, for unavoidable delays, such as may result from causes, which in the opinion of the Engineer-in-charge, are undoubtedly beyond the control of the contractor. The Engineer-in-charge 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 Engineer-in-charge 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 Engineer-in-charge whose decision will be final and binding. The contractor shall lodge in writing with the Engineer-in-charge, 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 Engineer-in-charge as to justify an extension of time in consequence thereof, such extension will be granted in writing by the Engineer-in-charge or other competent authority when ordering such alterations or additions.

23. Construction Programme

- 23.1 The Contractor shall furnish within 90 days of the order of the work a programme 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 Mile stone programme specified and shall obtain the approval of the Engineer-in-charge. 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 Engineer-in-charge. No revised program shall be operative without approval of Engineer-in-charge.
- 23.2 The Engineer-in-charge 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 Engineer-in-charge within 7 days of the Engineer-in-charge's direction to alter the order of progress of works.
- 23.3 The Contractor shall give written notice to the Engineer-in-Charge 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 Engineer-in-Charge 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.

24. Speed of Work:

- 24.1 The Contractor shall at all times maintain the progress of work to conform to the latest operative progress schedule approved by the Engineer-in-Charge. The contractor should furnish progress report indicating the programme and progress once in a month. The Engineer-in-Charge 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 Engineer-in-Charge. The compliance of such orders shall not entitle the contractor to any claim of compensation. Such orders of the Engineer-in-Charge 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.
- 24.2 Delays in Commencement or progress or neglect of work and forfeiture of earnest money, Security deposit and withheld amounts:
If, at any time, the Engineer-in-Charge 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 there after, be lawful for the Engineer-in-Charge to take suitable action in accordance with Clause.60 of APSS.

25. Suspension of works by the Contractor

- 25.1 If the Contractor shall suspend the works, or sublet the work without sanction of the Engineer-in-charge, or in the opinion of the Engineer-in-charge 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 Engineer-in-charge shall take action in accordance with Clause 61 of APSS.
- 25.2 If the Contractor stops work for 28 days and the Stoppage has not been authorized by the Engineer-in-charge the Contract will be terminated under Clause 61 of APSS.
- 25.3 If the Contractor has delayed the completion of works the Contract will be terminated under Clause 61 of APSS.

26. Extension of the Intended Completion Date

- 26.1 The Engineer-in-charge 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.
- 26.2 The Engineer-in-charge shall decide whether and by how much to extend the Intended Completion Date within 21 days of the Contractor asking the Engineer 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.

27. Delays Ordered by the Engineer-in-Charge

27.1 The Engineer-in-charge may instruct the Contractor to delay the start or progress of any activity within the Work.

28. Early Warning

28.1 The contractor is to warn the Engineer-in-charge at the earliest opportunity of specific likely future events or circumstances that may adversely affect the Execution of Works.

28.2 The Contractor shall co-operate with the Engineer-in-Charge in making and considering proposals for how the effect of such an event or circumstance can be avoided or reduced by anyone involved in the work and in carrying out any resulting instruction of the Engineer-in-Charge

29. Management Meetings

29.1 The Engineer-in-Charge 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.

Quality Control

31 A) Quality Control

- i) 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.
- ii) 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 hereunder, 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 Engineer-in-charge. 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 Engineer-in-charge.
- iii) List of equipment which should be made available at site by the contractor for testing of materials and cubes etc., is given below:

Sl.No.	Description of Item	Recommended Calibration Frequency
1.	Venire Calipers 0-150 mm	1 year
2.	Screw gauge 0-25 mm	1 year
3. a	Measurement tapes both Steel (3.0 m, 5.0 m) & Fiber (15.0 m)	At the time of purchase and the tapes to be changed after 12 Months, if any error is
3. b	30 cm steel scale	

		observed
4.	Weighing Machine 5.0 kg capacity	12 Months
5.	Sieves for Coarse aggregate	-
6.	Sieves for fine aggregate	-
7.	Cube moulds ISI marked 150 x150 x 150 mm (6 nos.)	-
8.	Compression testing machine 100 MT, hand operated at every work site whose Estimated contract value (ECV) is Rs. 100 lakhs and above. For less than Rs. 100 lakhs, arrangement for testing at approved lab.	12 Months
9.	Slump cone	-
10.	Carpenter's square 150mm with graduations	
11.	Electrical Meggar 1100 V	At the time of purchase
12.	Spirit level	-
13.	Plumb bob	-
14.	Measuring Jars (2) 250ml	-
15.	Magnetic compass	-
16.	Batching and mixing plant for concrete mixing (15-20 cum capacity)	-

- iv) Quality plan for Raw Materials: The contractor shall collect various raw materials well in advance before its use and shall get them tested as per the quality plan supplied by the Engineer-in-charge based on Quality Management System of ISO: 9001-2000. He shall ensure that no raw material is used unless it passes all the checks / tests as per the acceptance criteria given and a record of all checks / tests/ verifications shall be maintained at site. Tests which are required to be conducted at outside labs shall be done at those labs which have availability of required instruments traceable to national standards and which are approved by the Engineer-in-charge. Reports obtained from such labs should indicate the calibration status and traceability to national standards of their equipments for accepting the results.
- v) If the Engineer-in-charge instructs the contractor to carryout a test not specified in the specification to check whether any work has a defect, the contractor shall conduct the test at his own cost.
- vi) Quality control inspections: In addition to the normal inspection by the regular in charge of the construction, the work will also be inspected by the staff of Quality Control Wings or by the State or District level Vigilance Cell Unit and any authorized external agency and if any sub-standard work or excess payments are noticed with reference to measurement books etc., during inspection, recovery will be ordered based on their observations and these will be effected by the Engineer-in-charge of the execution of the work.

In addition, the Engineer-in-charge may engage external agencies for conducting quality audit in which case the following methodology would be adopted:

- a) The external agency shall conduct quality control tests as per the standard procedures in the presence of Construction and Quality Control Engineers and the Contractor who is executing the work.
- b) 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.

The recovery for any sub-standard work or excess payments noticed if any on account of the external quality also audit would be made as mentioned in the Para above.

The final bill will be released after a certificate furnished by the Engineer-in-charge that the work has been executed as per the standard specifications and then only the final bill can be released by Engineer-in-charge.

Records to be maintained at site :

- vii) Drawings: One copy of the drawings furnished to the contractor shall be kept by the contractor on the site and same shall be available for inspection and use by the Departmental officers.
- viii) Variations by way of modification, omissions or additions:
For all modifications omissions from or additions to the drawings and specifications, the Engineer-in-charge will issue revised plans, or written instructions, or both and modification, omission or additions shall be made unless authorized and directed by the Engineer-in-charge in writing.
- ix) The Engineer-in-charge 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.
- x) Site Order Book: The site order book shall be maintained by the contractors 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 Departmental Officer who issues such orders and signed by the contractor or by his representative towards compliance. The order book shall not be removed from the work spot except with the written permission of the Engineer-in-charge.
- xi) Quality Test Register (QTR): The contractor shall maintain the QTR at the site in the format specified and record therein the results of all the tests conducted by him. The relevant reports of the tests conducted shall be maintained in a separate file.
- xii) Other Documents: Other prescribed documents like register on calibration of equipments maintained at site and other checklists shall be maintained at site and produced for verification of inspecting officers.
- xiii) Return of site documents: All the site records / documents mentioned therein must be returned to the engineer-in-charge in full shape after the satisfactory completion of work

30. Identifying Defects

The Engineer-in-Charge shall check the Contractor's work and notify the Contractor of any Defects that are found. Such checking shall not affect the Contractor's responsibilities. The Engineer-in-Charge may instruct the Contractor to verify the Defect and to uncover and test any work that the Engineer considers may be a Defect.

31. Tests

If the Engineer-in-Charge 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.

33 Correction of Defects

33.1 The Engineer-in-Charge 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.

33.2 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.

34 Uncorrected Defects

34.1 If the contractor has not corrected the defect within the time specified in the Engineer-in-Charge's notice, the Engineer-in-Charge will assess the cost of having the defect corrected and the contractor will pay this amount.

34.2 The Engineer-in-Charge shall introduce O.K. cards and prescribe the formats thereof. O.K. cards shall relate to all major components of the work. The contractor / his authorized representative shall be required to initiate and fill in and present the O.K. card to the construction staff who would check the respective items and send to the quality control staff for final check and clearance / O.K. Any defects pointed out by the construction supervision staff or by the Quality Control staff shall promptly be attended to by the contractors and the fact of doing so be duly recorded on the back of O.K. card.

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

35 Deleted

C. COST CONTROL

36 Bill of Quantities

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

36.2 The Contractor is paid for the quantity of the work done at the estimate rate in the Bill of Quantities for each item plus or minus Tender percentage.

37 Supplemental items :

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

37.2 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.

37.2.1 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 Standard Schedule of Rates adopted in the sanctioned estimate with which the tenders are accepted plus or minus over all tender percentage.

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

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

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

38 Extra Items

38.1 Extra items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the Engineer-in-Charge. The rates for extra items shall be worked out by the Engineer-in-Charge as per the conditions of the Contract and the same are binding on the Contractor.

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

38.3 Entrustment of additional items

38.3.1 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 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 competent authority shall be obtained. Entrustment of such items on nomination shall be the estimated rates or agreement rates (-) Tender Percentage whichever is less.

38.3.2 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 rates for such items shall be worked out in accordance with the procedure - 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.

38.3.3 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 Engineer-in-charge 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 competent authority.

38.3.4 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.

39 Cash flow forecasts

When the program is updated, the contractor is to provide the Engineer-in-charge with an updated cash flow forecast.

40 Payment Certificates

40.1 The Contractor shall submit to the Engineer-in-charge monthly statements of the estimated value of the work completed less the cumulative amount certified previously.

40.2 The Engineer-in-charge shall check the Contractor's monthly statement within 14 days.

40.3 The value of work executed shall be determined by the Engineer-in-charge.

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

40.5 The Engineer-in-charge 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.

41 Payments

41.1 Payment for the work done by the contractor will be made for the finished work based on the measurements recorded in measurement books by concerned officer of the IIIT Srikakulam not lower in rank than a Assistant Engineer and check measured by concerned officer not lower in rank than a Deputy Executive Engineer. The measurements shall be recorded at various stages of the work done during and also after work is completed. The contractor shall be present at the time of recording of each set of measurement and their check measurement and accept them then and there so as to avoid disputes at a later stage. If the contractor is not available at the work spot at the time of recording measurements or check measurements, the particulars of measurements shall be signed by the authorized agent of contractor based on which the contractor shall accept the set of measurements without any further dispute. If for any reason the contractor's authorized agent is also not available at site when the department decides to suspend the work recording of measurements in the absence of the contractor or his authorized representative, the department shall not entertain any claim from the contractor for any loss incurred by him on this account. The Contractor shall however note that the IIIT Srikakulam cannot indefinitely wait for recording the measurement due to the absence of the Contractor and his authorized agent and check measure them even in the absence of the contractor.

41.2 Payments and Certificates

41.2.1 Payments shall be adjusted for recovery of , 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 Engineer-in-Charge, and intermediate payment will be the sum equal to 92.5% of the value of work done as so certified and balance of 7.5% will be withheld and retained as security for the due fulfillment of the contract under the certificate to be issued by the

Engineer-in-Charge. 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 2 ½ 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 24 months as all defects shall have been made good according to the true intent and meaning thereof.

- 41.2.2 In case of over payments or wrong payment 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 running bills or at any time thereafter from the deposits available with the IIIT Srikakulam.
- 41.2.3 Any recovery or recoveries advised by the Government Department either state or central, due to non-fulfillment of any contract entered into with them by the contractor shall be recovered from any bill or deposits of the contractor.
- 41.2.4 No claim shall be entertained, if the same is not represented in writing to the Engineer-in-Charge within 15 days of its occurrence.
- 41.2.5 The contractor is not eligible for any compensation for inevitable delay in handing over the site or for any other reason. In such case, suitable extensions of time will be granted after considering the merits of the case.

41.3 Intermediate Payments

- 41.3.1 For intermediate Stage of work, only part rates as fixed by the Engineer-in-Charge will be paid.
- 41.3.2 Part rates shall be worked out for the work done portion based on the actual operations involved keeping in view the value of the balance work to be done, to avoid unintended benefit to the Contractor in initial Stage.
- 41.3.3 Full rate shall be paid when the work is completed to the full profile as noted in the drawings.
- 41.3.4 Where payment is intended for aggregates by Bill of Quantities item based on stack measurements, 10% of the quantity measured will be withheld. No payment or advance will be made for unfixed materials when the rates are for finished work in site
- 41.3.5 The contractor shall supply as built drawings drawn to scale in 5 sets along with original tracings within 28 days of the issue of certificate of completion of work failing which an amount of Rs.25000/- will be withheld from the amounts due to the contractor.

42. A LIST OF PAYMENTS AND DEDUCTIONS FROM BILLS				
Nature of contract	Class of bill	Amount of payment	Nature of Deduction	Refund or deduction
(1)	(2)	(3)	(4)	(5)
Piece work contract	Intermediate Bill	(i) Total value of work done, if it is less than 20 times earnest money. (ii) Total value of work done less amount if any withheld for proper maintenance (L.S.) Contract.	Nil	Nil
-do-	Final Bill		5% of value of work in excess of 20 times earnest money to be held as security. To be credited to deposit only for the withheld amount excess Rs. 500/-. A suitable amount at the discretion of the Engineer for the proper maintenance.	To be refunded after final bill or deposit as stated in, otherwise to be refund in the final bill itself. To be refunded after expiry of the maintenance period of three months.
L.S. contract (supply of materials only)	Intermediate Bill	90% of the value of work	10% of value towards security.	Nil
-do-	Final Bill	Total value of work done	Nil	The 10% value withheld towards security to be refunded after expiry of Guarantee period.
L.S. contract (Supply of materials and constructions)	Intermediate Bill	92.5% of value or work done.	7.5% of value towards security.	Nil
-do-	Final Bill	92.5% of value of work done less amount if any with held for proper maintenance/rectifications.	7.5% of value towards security.	1) 5% out of 7.5% so far collected from bills to be refunded in final bill. 2) Balance 2.5% to be refunded on expiry of defects liability period or on rectification of any defects that appears during the defects liability period which ever happens latter. 3)The E.M.D. collected at the time of entering into agreement is also returnable along with item (2) above.

42 Interest on Money due to the Contractor

No omission by the Engineer-in-Charge or the sub-divisional officer 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.

43 Certificate of Completion of works

Certificate of Completion of works

43.1.1 When the whole of the work has been completed and has satisfactorily passed any final test that may be prescribed by the Contract, the Contractor may give a notice to that effect to the Engineer-in-Charge 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 Engineer-in-Charge to issue a Certificate of completion in respect of the Works. The Engineer-in-Charge 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 Engineer-in-Charge's opinion, required to be done by the Contractor before the issue of such Certificate. The Engineer-in-Charge 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 there in. The Contractor shall be entitled to receive such Certificate of the Completion within twenty one days of completion to the satisfaction of the Engineer-in-Charge of the Works so specified and making good of any defects so notified.

43.1.2 Similarly, the Contractor may request and the Engineer-in-Charge 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 Engineer-in-Charge and occupied or used by the Department.

43.1.3 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 Engineer-in-Charge 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.

44 Taxes included in the bid

The percentage quoted by the contractor shall be deemed to be exclusive of GST but inclusive of all other taxes on all materials that the contractor will have to purchase for performance of this contract.

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 department to the contractor on proof of payment to the extent

45 Price Adjustment

45.1 Price Adjustment will be assessed as per GO Ms No.35 T(R&B) (RI) Department Dated 28.02.2006 , GO Ms No. 73 T(R&B) (RI) Department Dated 24.04.2006 , GO Rt.No.175 T R&B (RI) Department, Dated 19.02.2007 , GO Ms.No.94 T R&B (RI) Department Dated 16-04-2008, GO Ms No.252 T R&B (RI) Department Dated 28-8-2008 and Go.MS.No.1, FINANCE (WORKS & PROJECTS-F7) DEPARTMNET, dated:25.02.12.

This Price Adjustment clause shall apply for Steel, Cement, Bitumen and P.O.L,
subject to the following conditions.

- 45.2 The Price Adjustment shall be both for increase and decrease in the prices for the works completed within the original agreement period.
- 45.3 In addition, the Price adjustment shall be for valid extension given for natural calamities duly limiting to the actual period/days lost and for portion of work where work is delayed due to land acquisition/shifting of utilities (this shall be limited to actual length affected).
- 45.4 The variation clause will be when the variation in rates is more or less than 5% of the rate provided in the technical sanctioned estimate based on which bids are invited or All India wholesale price index of the respective items.
- 45.5 Price adjustment shall be calculated separately for the components of the payment for work done in the manner explained in paras 46.5 to 46.9 below.
- 45.6 In the formula of Price Adjustment, R, the value of work shall exclude Seigniorage charges, GST and all other over head charges.

45.7 Adjustment clause for cement component shall be as follows

Price adjustment for increase or decrease in the cost of cement procured by the contractor shall be paid in accordance with **G.O.Ms.No.94 of T R&B Dept dt:16-4-2008 and Go.MS.No.1, FINANCE (WORKS & PROJECTS-F7) DEPARTMNET, dated:25.02.12.**

45.8 Adjustment clause for steel component shall be as follows:

Price adjustment for increase or decrease in the cost of steel procured by the contractor shall be paid in accordance with **G.O.Ms.No.94 of T, R&B Dept dt:16-4-2008 and Go.MS.No.1, FINANCE (WORKS & PROJECTS-F7) DEPARTMNET, dated:25.02.12.**

45.9 Adjustment clause for bitumen component shall be as follows:

Price adjustment for increase or decrease in the cost of bitumen procured by the contractor shall be paid in accordance with **G.O.Ms.No.252 of T, R&B Dept dt:28-8-2008 and Go.MS.No.1, FINANCE (WORKS & PROJECTS-F7) DEPARTMNET, dated:25.02.12**

45.10 Adjustment clause for POL component shall be as follows

Price adjustment for increase or decrease in the cost of POL shall be paid in accordance with **G.O.Ms.No.252 of T, R&B Dept dt:28-8-2008 and Go.MS.No.1, FINANCE (WORKS & PROJECTS-F7) DEPARTMNET,dated:25.02.12**

46 Retention:

- 46.1 The department shall retain from each payment due to the contractor @ the rate of 7.5% of bill amount until completion of the whole of the works.
- 46.2 On completion of the whole of the works 97.5% of the total amount retained is re-paid to the Contractor and 2.5% when the Defects Liability Period has passed and the Engineer-in-Charge has certified that all the Defects notified by the Engineer-in-Charge to the Contractor before the end of this period have been corrected.
- 46.3 On completion of the whole works, the contractor may substitute retention money with an "on demand" Bank Guarantee.

47 Liquidated Damages

- 47.1 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 Engineer-in-charge too slow to ensure completion by the prescribed time or extended time for completion Engineer-in-charge shall so notify the contractor in writing and the contractor shall there upon take such steps as are necessary and the Engineer-in-charge 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 Engineer-in-charge under this clause the contractor shall seek the Engineer-in-charge's permission to do any work at night or on Sundays, if locally recognized as days of rest, or their locally recognized equivalent, such permission shall not be unreasonably refused.
- 47.2 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 bonfire extensions allowed by the competent authority without levying liquidated damages), the Engineer-in-charge may without prejudice to any other method of recovery will deduct for the period of delays subject to a maximum of 10% of the contract value from any monies in his hands due or which may become due to the contractor. The payment or deductions of such damages shall not relieve the contractor from his obligation to complete the works, or from any other of his obligations and liabilities under the contract.
- 47.3 The liquidated damages for the whole of the work are Rs.1048/- (amount per day)

For milestone 1 -	Rs.1048/-	Per day
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The maximum amount of liquidated damages for the whole of the works is ten percent of final contract price.

48 Mobilization Advance:

- 48.1 The contractors for works exceeding more than Rs.1.00 Crore of estimated contract value are permitted to avail the facility of mobilization advance in two installments equivalent to 10% of the contract amount (5% for labour mobilization and 5% for machinery and equipment) named in the letter of acceptance payable as per above. Payment of the loan will be done under separate certification by the Engineer-in-charge after (i) Execution of the form of agreement by the parties there to (ii) Provisions by the contractor of the further security in accordance with relevant condition and (iii) provision by the contractor of a Bank Guarantee from Nationalized Bank acceptable to the

Engineer-in-charge for an amount equal to 12% (which includes 2% for the interest charges) of a contract amount as indicated in the letter of acceptance towards the first installment of the advance mobilization loan, such bank guarantee to remain effective until the said advance loan has been completely repaid by the contractor out of the current earnings under the contract and certified accordingly by the Engineer-in-charge. The 'Advance mobilization loan' will be paid in 30 days after fulfilling the above – i, ii, and iii items. Advance mobilization loan will be paid only in case of contracts with estimated contract value exceeding Rs.100 Lakhs.

- 48.2 The contractor exclusively for mobilization expenditures, including the acquisition of constructional plant, in connection with the works, shall use the advance mobilization loan. Payment of the second installment of advance mobilization loan equivalent to 5 percent of the contract amount will be due within a period of 9 Months for local purchase of machinery and equipment and within one year in case the machinery and equipment has to be imported under separate certification by the Engineer-in-Charge after (I) the value of the machinery and equipment procured, and brought to site and/or ordered (satisfactory evidence to be produced) by the contractor assessed at 100% for new machinery and 50% for old machinery brought to site and in working condition is equivalent to 5 percent of the contract amount already paid as first advance loan and (ii) furnishing by the contractor of a bank guarantee for an amount equal to 6 percent (one percent towards interest) of the contract value
- 48.3 Should the contractor misappropriate any portion of the advance loan, it shall become due to the Engineer-in-charge and payable immediately in one lump by the contractor and no further loan will be considered thereafter.
- 48.4 **The above advance shall bear an interest of 10.50% per annum or Government borrowing rate for the year 2017 - 18 whichever is more.** The interest on the amounts paid, as advance is chargeable from the date the amount is paid. However if completion is delayed by circumstances beyond control of the contractor for which an extension has been granted by the Engineer-in-charge the interest charges on such advances shall be waived for the period of extension.
- 48.5 The value of Bank Guarantee for the advance payment given to the contractor can be progressively reduced by the amount repaid by the contractor as certified by the Engineer-in-charge.

49 Recovery of advances:

- 49.1 The advance loan together with interest at the rate of 15% as specified in the above shall be repaid within percentages deductions from the intermediate payments under the contract. Deduction shall commence in the next interim payment following that in which the total of all such payments to the contractor have reached 10 percent of the contract amount and shall be made at the rate of 20 percent of amount of all interim payments in which the loan was made together with interest payable up to that date, until such time as the loan together with interest at the rate specified in Para

50 Securities:

- 50.1 The Earnest Money Deposit and Additional Security (for discount tender percentage beyond 15%) shall be provided to the IIIT Srikakulam 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 IIIT Srikakulam. The Earnest Money 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.

51 Cost of Repairs

- 51.1 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

52 Completion

- 52.1 The Contractor shall request the Engineer-in-Charge to issue a Certificate of completion of the Works and the Engineer-in-Charge will do so upon deciding that the work is completed.

53 Taking Over

- 53.1 The IIIT Srikakulam shall takes over the Site and the Works within seven days of the Engineer-in-Charge issuing a certificate of Completion.

54 Final Account

- 54.1 The Contractor shall supply to the Engineer-in-Charge a detailed account of the total amount that the Contractor considers payable under the Contract before the end of the Defects Liability Period. The Engineer-in-Charge 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 Engineer-in-Charge 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 Engineer-in-Charge shall decide on the amount payable to the Contractor and issue a payment certificate within 56 days of receiving the Contractor's revised account.

55 Termination

- 55.1 The Engineer-in-charge may terminate the Contract if the contractor causes a fundamental breach of the Contract.
- 55.2 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 Engineer-in-Charge.
 - b) The Contractor is made bankrupt or goes into liquidation other than for a reconstruction or amalgamation.
 - c) The Engineer-in-Charge gives Notice that failure to correct a particular Defect is a fundamental breach of Contract and the Contractor fails to correct it within a reasonable period of time determined by the Engineer-in-Charge; and
 - d) The Contractor does not maintain a security which is required and

- 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 judgment of the IIIT Srikakulam has engaged in corrupt or fraudulent practices in competing for or in the executing the contract.
- g) The Contractor has contravened Sub-Clause 6 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 of Conditions of Contract) and also fails to take satisfactory remedial action as per agreements reached in the management meetings (Clause 31) for a period of 15 days.
- i) The Contractor fails to carry out the instructions of Engineer-in-Charge within a reasonable time determined by the Engineer-in-Charge.

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 to the Government 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 Government of the benefits of free and open competition.

55.3 Notwithstanding the above the IIIT Srikakulam may terminate the contract for convenience.

55.4 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.

56 Payment upon Termination

56.1 If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer-in-Charge 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 the percentage to apply to the value of the work not completed representing additional cost for completing the works at the rate of 20 percent of balance work. Additional Liquidated Damages shall not apply. If the total amount due to the IIIT Srikakulam exceeds any payment due to the Contractor the difference shall be a debt payable to the IIIT Srikakulam.

57 Property

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

58 Release from Performance

58.1 If the Contract is frustrated by the outbreak of war or by any other event entirely outside the control of either the IIIT Srikakulam or the Contractor the Engineer-in-Charge 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

59 Water Supply

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

60 Land

60.1 Land for Contractor's use:

The contractor will be permitted to use Institute land for execution of work. The contractor shall have to make his own arrangements for acquiring and clearing the site, leveling, providing drainage and other facilities for labour staff colonies, site office, work-shop or stores and for related activities. The Contractor shall apply to the Institute within a reasonable time after the award of the contract and at least 30 days in advance of its use, the details of land required by him for the work at site and the land required for his camp and should any private land which has not been acquired, be required by the contractor for his use. The same may be acquired by the contractor at his own cost by private negotiations and no claim shall be admissible to him on this account. The Engineer-in-Charge reserves the right to refuse permission for use of any Institute land for which no claim or compensation shall be admissible to the contractor. The contractor shall, however, not be required to pay cost or any rent for the Government land given to him.

60.2 Surrender of Occupied Land:

- a. The IIIT Srikakulam land as here in before mentioned shall be surrendered to the Engineer-in-Charge within seven days, after issue of completion certificate. Also no land shall be held by the contractor longer than the Engineer-in-Charge shall deem necessary and the contractor shall on the receipt of due notice from the Engineer-in-Charge, vacate and surrender the land which the Engineer-in-Charge may certify as no longer required by the Contractor for the purpose of the work.
- b. The contractor shall make good to the satisfaction of the Engineer-in-Charge any damage to areas, which he has to return or to other property or land handed over to him for purpose of this work. Temporary structures may be erected by the contractor for storage sheds, offices, residences etc., for non-commercial use, with the permission of the Engineer-in-charge on the land handed over to him at his own cost. At the completion of the work these structures shall be dismantled site cleared and handed over to the Engineer-in-charge. The land required for providing amenities will be given free of cost from IIIT Srikakulam lands if available otherwise the contractor shall have to make his own arrangements.

60.3 Contractor not to dispose off Spoil etc. :-

The contractor shall not dispose off or remove except for the purpose of fulfillment of this contract, sand, stone, clay ballast, earth, trees and shrubs or other materials obtained in the excavation made or lying on the site of the work, and all such materials and produce shall remain property of the IIIT Srikakulam. The IIIT Srikakulam may upon request from the contractor, or if so stipulated in the conditions of the contract allow the contractor to use any of the above materials for the works either free of cost or after payment as may be specifically mentioned or considered necessary during the execution of the work.

61 Roads

In addition to existing public roads and roads Constructed by IIIT Srikakulam, if any, in work area all additional approach roads inside work area and camp required by the Contractor shall be constructed and maintained by him at his own cost. The layout design, construction and maintenance etc. of the roads shall be subject to the approval of the Engineer-in-Charge. The contractor shall permit the use of these roads by the IIIT Srikakulam free of charge.

It is possible that work at, or in the vicinity of the work site will be performed by the IIIT Srikakulam or by other contractors engaged in work for the IIIT Srikakulam during the contract period. The contractor shall without charge permit the IIIT Srikakulam and such other contractor and other workmen to use the access facilities including roads and other facilities, constructed and acquired by the contractor for use in the performance of the works.

The contractor's heavy construction traffic or tracked equipment shall not traverse any public roads or bridges unless the contractor has made arrangement with the authority concerned. In case contractor's heavy construction traffic or tracked equipment is not allowed to traverse any public roads or bridges and the contractor is required to make some alternative arrangements, no claim on this account shall be entertained. The contractor is cautioned to take necessary precautions in transportation of construction materials to avoid accidents.

62 Payment for Camp Construction

No payment will be made to the contractor for construction, operation and maintenance of camp and other camp facilities and the entire cost of such work shall be deemed to have been included in the tendered rate for the various items of work in the schedule of quantities and bids.

63 Explosive And Fuel Storage Tanks

No explosive shall be stored within $\frac{1}{2}$ (half) KM of the limit of the camp sites. The storage of gasoline and other fuel oils or of Butane, Propane and other liquefied petroleum gases, shall conform to the regulations of Andhra Pradesh State Government and Government of India. The tanks, above ground and having capacity in excess of 2000 liters, shall not be located within the camp area, nor within 200m, of any building.

64 Manpower

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 percentage shall include the expenditure towards importation of labour amenities to labour and staff;

The contractor shall, if required by the Engineer-in-Charge, deliver to the Engineer-in-Charge a written in detail, in such form and at such intervals as the Engineer-in-Charge 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 pertaining to Contractor's Equipment as the Engineer-in-Charge may require.

64.1 Transportation of Labour

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.

The contractor will at all times duly observe the provisions of employment of children Act XXVI of 1938 and any enactment or modification of the same and will not employ or permit any person to do any work for the purpose under the provisions of this agreement in contravention of said Act. The contractor here by agrees to indemnify the IIIT Srikakulam from and against all claims, penalties which may be suffered by the IIIT Srikakulam or any person employed by the IIIT Srikakulam by any default on the part of the contractor in the observance and performance of the provisions of the employment of children Act. XXVI of 1938 or any enactment or modification of the same.

As per Govt. memo No.721/Gr.(1)/81-15, dt:17.11.87. The contractor shall obtain the insurance at his own cost to cover the risk on the works to labour engaged by him during period of execution against fire and other usual risks and produce the same to the Engineer-in-charge concerned before commencement of work.

65 Safety Measures

- 65.1 The contractor shall take necessary precautions for 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 Engineer-in-charge or on his behalf from time to time and at all times.
- 65.2 Providing protective foot wear 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.
- 65.3 Providing protective head wear to workers at places like underground excavations to protect them against rock falls.
- 65.4 Providing masks to workers at granulates 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 area and storage bins abate to dust.
- 65.5 Getting the workers in such jobs periodically examined for chest trouble due to too much breathing in to fine dust.
- 65.6 Taking such normal precautions like fencing and lighting in excavation of trenches, not allowing rolls and metal parts of useless timber spread around, marking danger areas for blasting providing whistles etc.
- 65.7 Supply work men with proper belts, ropes etc., when working in precarious slopes and heights etc.
- 65.8 Avoiding un-insulated electrical wire etc., as they would electrocute the workers.

a. 65.9 a To prevent injury to personnel, extreme caution should be exercised when using any types of welding equipment. Injury can result from fire, explosions, electric shock, or harmful agents. Both the general and specific safety precautions listed below must be strictly observed by workers who weld or cut metals.

- b. Do not permit unauthorized persons to use welding or cutting equipment.
- c. Do not weld in a building with wooden floors, unless the floors are protected from hot metal by means of fire resistant fabric, sand, or other fireproof material. Be sure that hot sparks or hot metal will not fall on the operator or on any welding equipment components.
- d. Remove all flammable material, such as cotton, oil, gasoline, etc., from the vicinity of welding.
- e. Before welding or cutting, warn those in close proximity who are not protected to wear proper clothing or goggles.
- f. Remove any assembled parts from the component being welded that may become warped or otherwise damaged by the welding process.
- g. Do not leave hot rejected electrode stubs, steel scrap, or tools on the floor or around the welding equipment. Accidents and/or fires may occur.
- h. Keep a suitable fire extinguisher nearby at all times. Ensure the fire extinguisher is in operable condition.
- i. Mark all hot metal after welding operations are completed. Soapstone is commonly used for this purpose.

PERSONAL PROTECTIVE EQUIPMENT

a. General. The electric arc is a very powerful source of light, including visible, ultraviolet, and infrared. Protective clothing and equipment must be worn during all welding operations. During all oxyacetylene welding and cutting processes, operators must use safety goggles to protect the eyes from heat, glare, and flying fragments of hot metals. During all electric welding processes, operators must use safety goggles and a hand shield or helmet equipped with a suitable filter glass to protect against the intense ultraviolet and infrared rays. When others are in the vicinity of the electric welding processes, the area must be screened so the arc cannot be seen either directly or by reflection from glass or metal.

b. Helmets and Shields.

(1) Welding arcs are intensely brilliant lights. They contain a proportion of ultraviolet light which may cause eye damage. For this reason, the arc should never be viewed with the naked eye within a distance of 50.0 ft (15.2 m). The brilliance and exact spectrum, and therefore the danger of the light, depends on the welding process, the metals in the arc, the arc atmosphere, the length of the arc, and the welding current. Operators, fitters, and those working nearby need protection against arc radiation. The intensity of the light from the arc increases with increasing current and arc voltage. Arc radiation, like all light radiation, decreases with the square of the distance. Those processes that produce smoke surrounding the arc have a less bright arc since the smoke acts as a filter. The spectrum of the welding arc is similar to that of the sun. Exposure of the skin and eyes to the arc is the same as exposure to the sun.

(2) Being closest, the welder needs a helmet to protect his eyes and face from harmful light and particles of hot metal. The welding helmet (fig. 2-1) is generally constructed of a pressed fiber insulating material. It has an adjustable headband that makes it usable by persons with different head sizes. To minimize reflection and glare produced by the intense light, the helmet is dull black in color. It fits over the head and can be swung upward when not welding. The chief advantage of the helmet is that it leaves both hands free, making it possible to hold the work and weld at the same time.

- 66 c. Safety Goggles. During all electric welding processes, operators must wear safety goggles (fig. 2-3) to protect their eyes from weld spatter which occasionally gets inside the helmet. These clear goggles also protect the eyes from slag particles when chipping and hot sparks when grinding. Contact lenses should not be worn when welding or working around welders. Tinted safety glasses with side shields are recommended, especially when welders are chipping or grinding. Those working around welders should also wear tinted safety glasses with side shields.
- 67 d. Protective Clothing.
- 68 (1) Personnel exposed to the hazards created by welding, cutting, or brazing operations shall be protected by personal protective equipment in accordance with OSHA standards, Subpart I, Personal Protective Equipment, paragraph 1910.132. The appropriate protective clothing (fig. 2-4) required for any welding operation will vary with the size, nature, and location of the work to be performed. Welders should wear work or shop clothes without openings or gaps to prevent arc rays from contacting the skin. Those working close to arc welding should also wear protective clothing. Clothing should always be kept dry, including gloves.
- 69 WELDING IN CONFINED SPACES**
- 70 a. A confined space is intended to mean a relatively small or restricted space such as a tank, boiler, pressure vessel, or small compartment of a ship or tank.
- 71 b. When welding or cutting is being performed in any confined space, the gas cylinders and welding machines shall be left on the outside. Before operations are started, heavy portable equipment mounted on wheels shall be securely blocked to prevent accidental movement.
- 72 c. Where a welder must enter a confined space through a manhole or other all opening, means will be provided for quickly removing him in case of emergency. When safety belts and life lines are used for this purpose, they will be attached to the welder's body so that he cannot be jammed in a small exit opening. An attendant with a preplanned rescue procedure will be stationed outside to observe the welder at all times and be capable of putting rescue operations into effect.
- 73 d. When arc welding is suspended for any substantial period of time, such as during lunch or overnight, all electrodes will be removed from the holders with the holders carefully located so that accidental contact cannot occur. The welding machines will be disconnected from the power source.
- 74 e. In order to eliminate the possibility of gas escaping through leaks or improperly closed valves when gas welding or cutting, the gas and oxygen supply valves will be closed, the regulators released, the gas and oxygen lines bled, and the valves on the torch shut off when the equipment will not be used for a substantial period of time. Where practical, the torch and hose will also be removed from the confined space.
- 75 f. After welding operations are completed, the welder will mark the hot metal or provide some other means of warning other workers.

76 Fair Wage Clause

- 76.1 The contractor shall pay not less than fair wages to laborers engaged by him on the work.
- 76.2 "Fair" wages means wages whether for time or piecework notified by the Government from time in the area in which the work is situated.
- 76.3 The contractor shall notwithstanding 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.
- 76.4 In respect of labour directly or indirectly employed in the works for the purpose of the contractors 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 IIIT Srikakulam. He shall maintain his accounts and vouchers on the payment of wages to the laborers to the satisfaction of the Engineer-in-charge.

- 76.5 The Engineer-in-charge 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.
- 76.6 The contractor shall be primarily liable for all payments to be made and for the observance of the regulations framed by the Govt., from time to time without prejudice to his right to claim indemnity from his sub-contractors.
- 76.7 As per contract labour (Regulation and abolition) Act. 1970 the contractor has to produce the license obtained from the licensing officers of the labour department along with the tender or at the time of agreement.
- 76.8 Any violation of the conditions above shall be deemed to be a breach of his contract.
- 76.9 Equal wages are to be paid for both men and women if the nature of work is same and similar.
- 76.10 The contractor shall arrange for the recruitment of skilled and unskilled labour local and imported to the extent necessary to complete the work within the agreed period as directed by the Engineer-in-charge in writing.

77 Indemnity Bond:

The tenderers should submit Indemnity Bond at the time of the Agreement as specified below.

Name of work: Improvements to Mithra campus (IIIT SKLM Boys campus) at Chinaravpalli (Vill), Etcherla (Mandal), Srikakulam (Dist).I/We

_____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 IIIT Srikakulam and with other Government Departments / Corporations.

78 Compliance With Labour Regulations

During continuance of the contract, the contractor and his sub contractors shall abide at all times by all existing labour enactments 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 construction industry are given below. The contractor shall keep the IIIT Srikakulam indemnified in case any action is taken against IIIT Srikakulam 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 IIIT Srikakulam 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 IIIT Srikakulam shall have the right to deduct any money due to the contractor including his amount of performance security. The IIIT Srikakulam 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 IIIT Srikakulam.

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

79 Salient features of some major labour laws applicable to establishment engaged in buildings and other construction work:

- 69.1. Workmen compensation Act 1923: The Act provides for compensation in case if injury by accident arising out of and during the course of employment.
- 69.2. 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.

- 69.3. Employees P.F. and Miscellaneous provision Act 1952: The Act provides for monthly contributions by the Department 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.,
- 69.4. Maternity Benefit Act 1951: The Act provides for leave and some other benefits to women employees in case of confinements or miscarriage etc.
- 69.5. 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 Department by Law. The Principal Department is required to take certificate of Registration and the contractor is required to take license from the designated Officer before concluding agreement. The Act is applicable to the establishments or Contractor of Principal Department if they employ 20 or more contract labour.
- 69.6. Minimum wages Act 1948: The Department is supposed to pay not less than the Minimum wages fixed by appropriate Government as per provisions of the Act if the employment is a scheduled employment construction of Buildings, Roads, Runways are scheduled employments.
- 69.7. 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.
- 69.8. 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.
- 69.9. 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.
- 69.10. (j) 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 Department on matters provided in the Act and get the same certified by the designated Authority.
- 69.11. Trade Unions Act 1926: The Act lays down the procedure for registration of trade unions of workmen and Departments. The Trade Unions registered under the act have been given certain immunities from civil and criminal liabilities.
- 69.12. 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.
- 69.13. 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.

- 69.14. The Building and Other Construction workers (regulation of Employment and conditions of service) Act 1996 and the Cess Act of 1996: All the establishments who carry on any building or other construction work and employs 10 or more workers are covered under this Act. All such establishments are required to pay cess at the rate not exceeding 2% of the cost of construction as may be modified by the Government. The Department of the establishment is required to provide safety measures at the Building or construction work and other welfare measures, such as Canteens, First-aid facilities, Ambulance, Housing accommodations for workers near the work place etc. The Department to whom the Act applies has to obtain a registration certificate from the Registering Officer appointed by the Government.
- 69.15. 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.
- 69.16. Payment of bonus act 1965: The Act is applicable to all establishments employing 20 or more employees. The Act provides for payment of annual bonus subject to a minimum of 8.33% of wages and maximum of 20% of wages to employees drawing Rs. 3500/- per month or less. The bonus to be paid to employees getting Rs.2500/- per months or above and up to Rs.3500/- per month shall be worked out by taking wages as Rs.2500/- per monthly 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.

80 Liabilities of the Contractor

80.1 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 concerned Asst. Engineer / Asst. Executive Engineer of the IIIT Srikakulam the act of such accident. The contractor shall indemnify IIIT Srikakulam against all loss or damage sustained by the IIIT Srikakulam resulting directly or indirectly from his failure to give intimation in the manner aforesaid including the penalties or fines if any payable by IIIT Srikakulam as a consequence of IIIT Srikakulam failure to give notice under workmen's compensation Act or otherwise conform to the provisions of the said Act. in regard to such accident.

- 80.2 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 IIIT Srikakulam it shall be lawful for the Engineer-in-charge to retain such sum of money which may in the opinion of the Engineer-in-charge be sufficient to meet such liability. The opinion of the Engineer-in-charge shall be final in regard to all matters arising under this clause.
- 80.3 The contractor shall at all times indemnify the IIIT Srikakulam against all claims which may be made under the workmen's compensation act or any statutory modification thereafter or rules hereunder 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.

81 Contractor's Staff, Representatives and Labour

- (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 the works, a Work Manager or sufficient status, experience and office and duly authorize him to deal with all aspects of the day-today 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 Engineer-in-Charge in prescribed proforma as he may require to assess and ensure the proper progress of work.

82 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.

83 Relationship

Contractor shall have to furnish information along with tender, about the relationship he is having with any officer of the IIIT Srikakulam.

84 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.

85 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 almost 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 Engineer-in-Charge and
- (iii) The construction programme given by the Contractor and agreed upon by the Engineer-in-Charge envisages such night working or working during Sundays or authorized holidays.

86 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 Engineer-in-Charge 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 Engineer-in-Charge, the Contractor can use the sites accordingly.

87 Use of blasting materials

Procurement of blasting materials and its storage is the responsibility of the contractor. The contractor shall engage licensed blaster for blasting operation. The contractor is to act in accordance with Indian Explosive Act and other rules prevailing, during the execution of work. It is the responsibility of the contractor to see, that works by other agencies in the vicinity are not hampered, in such cases if any claim is made by other agencies that should be borne by the contractor. Carriage of blasting materials, from the magazine to the work site, is the responsibility of the contractor.

88 Plant and Equipment

88.1 The contractor shall have sufficient plant, equipment and labour and shall work such hours and shifts as may be necessary to maintain the progress on the work as per the approval progress schedule. The working and shifts hours shall comply with the Govt. Regulations in force.

88.2 It is to expressly and clearly understood that contractor shall make his own arrangements to equip himself with all machinery and special tools and plant for the speedy and proper execution of the work and the IIIT Srikakulam does not undertake responsibility towards their supply.

88.3 The IIIT Srikakulam shall supply such of the machinery that may be available on hire basis but their supply cannot be demanded as matter of right and no delay in progress can be attributed to such non-supply of the plant by the IIIT Srikakulam and the IIIT Srikakulam cannot be made liable for any damage to the contractor. The Contractor shall be responsible for safe custody of the IIIT Srikakulam machinery supplied to him (which will be delivered to contractor at the machinery yard at site of work) and he has to make good all damages and losses if any other than fire, wear and tear to bring it to the conditions that existed at the time of issue to the contractor before handing over the same to the IIIT Srikakulam. The hire charges for the machinery handed over to the contractor will be recovered at the rate prevalent at the time of supply. The contractor will have to execute supplemental agreement with Engineer-in-charge at the time of supply of the machinery.

88.4 The acceptance of IIIT Srikakulam machinery on hire is optional to the contractor.

89 Steel forms

Steel forms should be used for all items involving and use of centering and shuttering shall be single plane without any dents and undulations.

90 Inconvenience to public

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

91 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 Engineer-in-Charge, or any persons on their behalf, in relation to the obtaining or to execution of this, or any other contract with Engineer-in-Charge 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. Engineer-in-Charge shall then be entitled to deduct the amount, so payable from any money, otherwise due to the contractor under this or any other contract.

92 Contract documents and materials to be treated as confidential

All documents, correspondences, 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.

93 General obligations of Contractor

93.1 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.

93.2 The contractor shall promptly inform the IIIT Srikakulam and the Engineer-in-Charge of any error, omission, fault, 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.

93.3 Disputes

If Contractor believes that a decision taken by the Engineer-in-Charge was either outside the authority given to the Engineer-in-Charge 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 Engineer-in-Charge's decisions on occurrence of such event.

93.4 Procedures for disputes

83.4.1 The technical expert shall give a decision in writing within 28 days after receipt of a notification of a dispute.

83.4.2 The Technical expert shall be paid daily at the rate specified in the contract data together with reimbursable expenses of the types specified in the contract Data and the cost shall be divided equally between the employer and the contractor, whatever decision is reached by the technical expert. Either party may refer a decision of the technical expert to an Arbitrator within 28 days of the technical expert's written decision. If neither party refers the dispute to arbitration within the above 28 days, the technical expert's decision will be final and binding.

83.4.3 Appointing Authority for the Technical Expert:

Director, IIIT Srikakulam

83.4.4 The Technical expert's daily fee is Rs.2,000/- together with reimbursable expenses as of the type like stationery, typing, postage, conveyance etc. . Arbitration takes place in Srikakulam.

83.4.5 Replacement of Technical Expert: Should the Technical expert resign or die, or should the employer and the contractor agree that the Technical Expert is not fulfilling his functions in accordance with the provisions of the contract, a new Technical expert will be jointly appointed by the employer and the contractor. In case of disagreement between the employer and contractor, within 30 days, the Technical expert shall be

designated by the Appointing Authority designated in the Contract data at the request of either part, within 14 days of receipt of such request.

83.5 Pending finalization of disputes, the contractor shall proceed with execution of work with all due diligence.

84 Security measures

- 84.1. Security requirements for the work shall be in accordance with the Institute / Government'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.
- 84.2. All contractors' employees, representatives and sub-contractor's employees shall wear identifications cards provided by the contractor. Cards shall identify the contractor, showing employee's number and shall be worn at all times while at the site. Individual labour will not be required to wear identification badges.
- 84.3. All vehicles used by the contractor shall be clearly marked with contractor's name.
- 84.4. 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.
- 84.5. 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
- 84.6. Separate payment for provision of security services will not be made and its cost shall be deemed to have been included in the offer of the tenderer.

85 Fire fighting measures

- a. The contractor shall provide and maintain adequate fire fighting 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.

86 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 Engineer-in-Charge may enforce them at the expenses of the Contractor.

The contractor special attention is invited to clause 37, 38, 39 and 51 of the preliminary specification to the A.P.S.S. and he is requested to provide at his own

expenses the following amenities to the satisfaction of Engineer-in-charge concerned.

86.4 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.

86.5 Drinking water:

- a. Water of good quality for drinking purpose shall be provided for the worker on a scale of not less than 2 gallons per head per day.
- b. Where drinking water is obtained from an intermittent public water supply each work site shall be provided with a storage tank, where such drinking water shall be stored.
- c. Every water supply storage shall be at a distance of not less than 10 M. from any latrine drain or other source of pollution where water has to be drained. Any existing well, which is within such proximity of any latrine, drain or other source of pollution, the well shall be properly chlorinated before water is drawn from it for drinking. All such wells shall be dust and water proof.
- d. A reliable pump shall be fitted to each inner well. The trap door shall be kept locked and opened only for inspection or cleaning which shall be done at least once a month.

86.3 Washing and bathing place

Adequate washing and bathing places shall be provided separately for men and women. Such place shall be kept clean and well drained, bathing or washing should not be allowed in or near any drinking water well.

86.4 Latrine and Urinals:

There shall be provided within the area of every work site latrines and urinals in an accessible place to men and women separately. For each of them shall be on the following scales or the scale as directed by Engineer-in-charge in any particular case.

1. Where the number of persons employed does not exceed 50 2
 2. Where the number of persons employed exceeds 50 but does not exceed 100 3
 3. For every additional 100 3
- If women are employed, separate latrines and urinals separated from those for men shall be provided on the same scale.

Except in work site provided with water flushed latrines connected with a water borne sewage systems all latrine shall be cleaned at least four times daily and at least twice during working hours and kept in a strict sanitary condition. The receipt scales shall be tarred inside and outside at least once a year.

The excrete from the latrines shall be disposed off at the contractors expenses in a way approved by the local public health authority. The contractor shall also employ adequate number of scavengers and conservancy shall to keep the latrines and urinals in a clean condition.

86.5 Shelters during Rest

At the work site there shall be provided free of cost two suitable sheds, one for meals and other for rest for the use of workers.

86.6 Crèches

At every work site at which 50 or more women workers are ordinarily employed there shall be provided two huts of suitable size for use of children under the age of 6 years. One hut shall be used for infants games and other as a bed room. The hut shall be constructed on a standard not lower than the following.

1. Thatched roofs
2. Mud floors and wall
3. Planks spread over the mud floor and covered with matting. The use of huts shall be restricted to children their attendants and mothers of the children.

86.7 Canteens:

A cook for canteen on a moderate scale shall be provided for the benefit of works if it is considered essential.

86.8 Sheds for the workers:

The contractor should provide at his own expense sheds for housing the workers. The sheds shall be on a standard not less than the cheap shelter type to have in which the workers in the locality are accustomed. The sheds are to be in rows with 1.5 Mts., clear space between sheds and 2.5 Mts. clear space between roofs. If conditions permit, the workers camp shall be laid out in units of 400 persons each unit to have a clear space of 4' each side.

86.9 Land should be acquired temporarily for Storing Contractor's materials or for housing their staff.

The contractor should make his own arrangements for temporary acquisition of land required for storing his materials and for the housing of his staff at his own expenses.

87 Ecological balance

a) The contractor shall maintain ecological balance by preventing de-forestation, water pollution and defacing of 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.

- i) Where unnecessary destruction, scarring, damage or defacing may occur, as 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 area including borrow areas shall be smoothened and graded in a manner to conform to the natural appearances of the landscape as directed by the Engineer-in-Charge.
- ii) 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 Engineer-in-Charge. 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 Engineer-in-Charge. 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.

(iii) 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 river. Such pollutant 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 wastes shall be disposed off in a manner and at sites approved by the Engineer-in-Charge.

(iv) In 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 in to 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.

b) 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 Engineer-in-Charge at the cost of the Contractor, Orders of the Engineer-in-Charge in this respect would be final and binding on the contractor.

88 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 Engineer-in-Charge. The contractor will be held responsible for all unauthorized cutting or damage of 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 tress 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 IIIT Srikakulam and shall be properly stacked at site, approved by the Engineer-in-Charge. 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 IIIT Srikakulam by the contractor, he shall be charged for the same at the rates to be decided by the Engineer-in-Charge. The recovery of this amount shall be made in full from the intermediate bill that follows.
- c) The contractor shall also make arrangements of fuel deposits for supply of required fuel for the laborer to be employed for cooking purpose at his own cost in order to prevent destruction of vegetation growth in the surrounding area of the work site.

89 Possession prior to completion

The Engineer-in-charge shall have the right to take possession of or use any completed part of work or works or any part there of 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 with in the interest of Clause 28 of APSS except where expressly otherwise specified by the Engineer-in-charge.

90 Payment upon termination

If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer-in-Charge 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 the percentage to apply to the value of the work not completed representing additional cost for completing the works at the rate of 20 percent of balance work. Additional Liquidated Damages shall not apply. If the total amount due to the IIIT Srikakulam exceeds any payment due to the Contractor the difference shall be a debt payable to the IIIT Srikakulam. 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.

91 Access to the contractor's books

Whenever it is considered necessary by the Engineer-in-Charge 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 Engineer-in-Charge.

92 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 Engineer-in-Charge and the Engineer-in-Charge's representative and by any other persons authorized by the Engineer-in-Charge in writing.

93 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.

94 Variations by way of modification, omissions or additions

- a. For all modifications, omissions from or additions to the drawings and specifications, the Engineer-in-charge 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 Executive Engineer in writing.
- b. The Engineer-in-Charge 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.
- c. Engineer-in-Charge'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 Engineer-in-Charge, which shall be given in writing shall be binding on the contractor.

95 Site Order Book

An order book shall be kept at the Department office on 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 Departmental officer who issues such orders and by the contractor or by his representative. The order book shall not be removed from the work spot except with the written permission of the Engineer-in-charge.

96 Care and diversion of river/stream

The contractor shall submit details regarding the diversion and care of river or stream during construction of the work along with a separate print-out of the time table showing earliest and latest start and finish dates of various activities. He should submit a detailed layout plan with drawings for the diversion and care of river of stream during construction of work. The above arrangements shall be at contractor's cost.

97 Income tax

- a) During the currency of the contract deduction of income tax at 2.24% or amended from time to time shall be made from the gross value of each bill of the contract, the contract value of which is in excess of Rs.20,000/- for deduction of tax at rates 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.

98 Seigniorage charges

The Seigniorage charge will be remitted as per the rates prescribed by the State Government / Mines and Geology Department from time to time and as per the government orders in vogue at that time for the materials used on the work. In data Seigniorage charges are not included.

99 Goods and Service tax on works contracts

- 99.1. The rates included in BOQ (schedule-A) are exclusive of GST
- 99.2. GST at the prescribed rates as indicated by the Government from time to time will be worked out and added in the work bill. The GST component added thus to the work will be recovered.
- 99.3. The contractor shall produce a valid GSTIN certificate before payment of the final bill. Otherwise payment to the contractor will be withheld.

100 Deleted

- 100.1. Institute of national academy of Construction : An amount equivalent to 0.25% of gross amount of bill will be deducted from each bill of the contractor and remitted to the "National Academy of Construction" at Hyderabad.
- 100.2. CESS: "An amount equivalent to 1% of gross amount will be deducted from each bill of the Contractor towards cess and will be remitted to Andhra Pradesh Building and other Construction workers, Welfare Board as per G.O.Ms.No.57, LET&F(Lab.II) Department dt.26-06-2007 and G.O.Ms.No.59, LET&F(Lab.II) Department dt.29-06-2007".

101 Supply of construction materials

- i. The contractor has to make his own arrangements for procurements, 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 IIIT Srikakulam/ Government 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.

102 CONSTRUCTION MATERIALS

- 102.4 The contractor has to make his own arrangement for procurement, supply and use of all construction materials including cement, steel and blasting materials etc., and compliance of following should be ensured.
 - a. All materials so procured should confirm to the relevant specifications indicated in the tender documents or to alternative standards or specifications which are equal or higher in quality than those specified subject to Engineer-in-Charge's prior review and written approval difference between the standards specified and the proposed alternatives must be fully described by the contractor and

submitted to Engineer-in-Charge's at least 30 days prior to the date when the contractor desires Engineer-in-Charge's approval. In the event Engineer-in-Charge determines that the alternative do not ensure equal or higher quality the same will be rejected and the contractor shall comply with the standards set forth within the documents.

- b. All materials to be supplied should fully confirm to provisions of A.P.S.S. / I.S. Specifications as applicable.

102.5 Materials, workmanship, period and certificate of maintenance and defect liability, quality:-

All materials and workmanship shall be of the respective kinds described in the contract and in accordance with Engineer-in-Charge's instructions and shall be subjected from time to time to such tests as the Engineer-in-Charge may direct at the place of manufacture or fabrication or on the site or at such other place or places as may be specified in the contract, or at all or any of such places. The contractors shall provide such assistance, instruments, machines, labour and materials as are normally required for examining measuring and testing the work and the quality weight or quantity of any materials used and shall supply samples of materials before incorporation in the works for testing as may be selected and required by the Engineer-in-Charge.

102.6 Tests, inspection of defective materials:

The contractor shall without extra cost provide samples and co-operate in the testing of materials. The Engineer-in-Charge shall have access at all times to the places of storage and where materials are being manufactured and proceeded for use in the works under contract to determine whether their manufacture and process are proceeding in accordance with the drawings and specifications. The Engineer-in-Charge shall during the progress of the works have power to order in writing from time to time in respect of the following.

- a) The removal from the site, within such time or times as may be specified in the order of any materials which in opinion of the Engineer-in-Charge, are not in accordance with contract.
- b) The substitution of proper and suitable materials and
- c) The removal and proper re-execution, not with standing of any work which in respect of materials or workmanship is not, in the opinion of the Engineer-in-Charge, in accordance with contract.

The contractor shall carry out such order at no extra cost to the Engineer-in-Charge. In case of default on the part of the contractor in carrying out such order, the Engineer-in-Charge shall be entitled to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be recoverable from the contractor by Engineer-in-Charge or may be deducted by the Engineer-in-Charge from any monies due to or which may become due to the contractor.

In lieu of removing the work or materials not in accordance with the contract the Engineer-in-Charge may order such work or materials to remain and in that case such may be paid at the reduced rates as may be decided by Engineer-in-Charge. However any action by the Engineer-in-Charge under this para shall not any way absolve the contractor from his responsibility and liabilities as per conditions of contract.

102.7 CEMENT

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 Engineer-in-charge. 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 Engineer-in-charge for actual weighing 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 Engineer-in-charge at least once in a month in advance before the use of cement bags brought and kept at site go down. Cement bags required for testing shall be supplied by the contractor free of cost.
- c) The contractor should store 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 Engineer-in-charge.
- d) The contractor shall forthwith remove from the works area any cement that the Engineer-in-charge may disallow for use on account of failure to meet with required quality and standard.
- e) 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 Engineer-in-charge or the representatives shall have free access to such stores at all times.
- f) The contractor shall further at all times satisfy the Engineer-in-charge 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 Engineer-in-charge for the purpose and the contractor shall at all times keep his records up to date to enable the Engineer-in-charge to apply such checks as he may desire.
- g) 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 department and no claims will be entertained. The contractor shall forthwith remove from the work area any cement the Engineer-in-charge may disallow for use on work and replace it by cement complying with the relevant Indian Standards.

103 STEEL

The contractors shall procure mild steel (M S) reinforcement bars, High yield strength deformed bars (HYSD) bars, rods and structural steel etc., required for the works, only from the main or secondary producers, manufacturing steel to the prescribed specification of Bureau of Indian Standards or equivalent and licensed to affix ISI or other equivalent certifications marks and acceptable to the Engineer-in-charge. Necessary test certificates for each consignment are to be produced to Engineer-in-charge before use on works. The original bills of procurement should be submitted to the Engineer-in-charge for making payment of the item

104.1 The diameter and weight of steel should be as follows

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	1.56
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.

105 I.S. 383/1970 TABLE - I

105.1 COARSE AGGREGATE

I.S. Sieve Designation	Percent passing for single sized aggregate of Metal Size						Percentage passing for graded-aggregate of Nominal Size			
	63 mm	40 mm	20 mm	16 mm	12.50 mm	10 mm	40 mm	20 mm	16 mm	12.50 mm
80 mm	100	-	-	-	-	-	100	-	-	-
63 mm	85-100	100	-	-	-	-	-	-	-	-
40 mm	0-30	85-100	100	-	-	-	95-100	100	-	-
20 mm	0-5	0-20	85-100	100	-	-	30-70	95-100	100	100
16 mm	-	-	-	85-100	100	-	-	-	90-100	-
12.5 mm	-	-	-	-	85-100	100	-	-	-	90-100
10 mm	0-5	0-5	0-20	0-30	0-45	85-100	10-35	25-55	30-70	40-85
4.75 mm	-	-	0-5 2.36 mm	0-5	0-10	0-20	0-5 0-5	0-10	0-10	0-10
			-	-	-	-	-	-	-	-

TABLE - II
105.2 FINE AGGREGATE

I.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	13-70	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
15.00 microns	0-100	0-10	0-10	0-15

TABLE - III
105.3 ALL-IN AGGREGATE GRADING

I.S. Sieve Designation	40 mm Nominal	20 mm Nominal
80.00 mm	100	-
40.00 mm	95-100	95-100
20.00 mm	45-75	30-50
4.75 mm	24-75	10-35
600.00 microns	8-30	0-6
150-00 microns	0-60	-

TABLE - IV

105.4 For vibrated Reinforced concrete items (V.R.C.C.)

Characteristic Strength of Cube at the age of 28 days of curing				
M-25	1:1:2	25N/mm ²	=	250 kgs/cm ²
M-20	1:1½:3	20 N/mm ²	=	200 kgs/cm ²
M-15	1:2:4	15 N/mm ²	=	150 kgs/c

106 STORAGE OF CEMENT

- 106.1 It is often necessary to store Portland cement, some times for a period months. This is particularly true when transportation facilities must be need to their capacity and deliveries.
- 106.2 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. Finally ground cement stored in stacks lend to deteriorate more than coarse cements. In this respects normal hardening Portland cement and high aluminum cements at least affected than rapid hardening Portland cement.
- 106.3 American, Spanish and German experiments have shown that on average the strength of cement stress in bags is reduced.
- After 12 Months by 15 to 20 percent.
 - After 12 Months by 20 to 30 percent.
 - After 12 Months by 30 to 50 percent.
 - After 2 years by 10 to 50 percent.
 - After 4 1/2 years by 50 to 60 percent.
- 106.4 These figures prove that special attention should be paid to the storage of cement, even when its strength is equal to or suspense's the specified normal strength.
- 106.5 With an extensive range of climate conditions it is difficult to lay down universal rules for the storage of cement by the general principle should always be kept in mind that it must be protected as far as possible from any form of moisture prior to mixing concrete mortar.
- 106.6 During the dry weather in main parts of the country where the relative humidity of the atmosphere even in nights is low (that is to say when there is very little moisture in the air) little or no protection may be necessary and the cement in its stock may require no more than a tarpaulin through for the stack. But there are parts of the country particularly near the coast where the atmosphere is always damp at any time of day or night and then greater precautions are necessary. In such place such as the west coast and the Niligiries and period when heavy rain falls are encountered such greater care has to be taken of the cement and proper strength provided it from the damp.
- 106.7 Whenever there is any possibility of the cement exposed to moisture either in the atmosphere or actual ratio it should be stored in a well constructed dry go down or shed. The cement store should be whether right construction preferable with terraced roofing with a sound wooden or ground to ensure that it is damp proof building with plant roofing are prohibited because of their tendency to leak. Corrugated sheets roofing has tendency to the condense moisture and should be protected by field to prevent wind and rain driving through 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 a sheet of water proof paper should be provided. If none of these is possible than 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 slightly 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.

- 106.8 Cement should be stored in piles arranged parallel to the walls. It is advisable to pile bags against the walls and an allowance of at least 0.3M all round should be made between the exterior walls piles at least 0.6M wide should be left for each access and delivery. The outside stacks deteriorate a similar pile. Successive consignments covered with some water proof 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.
- 106.9 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 either weather resisting covers. Storage under these conditions should be limited to 48 hours. The tarpaulin should be raised well above the top most Tie of bags and must be sloped for rapid drainage in case of showers.
- 106.10 The storage place required for a given quantity of cement can be calculated from the following data. If spread losses over the floor of a store to a depth of 1st floor a ton of cement required about 2.50 Sqm. If stored in paper bags laid on their side the area required is 5.00 Sqm to 6.00 Sqm. per ton if laid in a single tier and proportionately less if laid on more than one tier. If the bags are stacked in any other manner feet portion the minimum area provided should be increased to allow space for passage etc., to avoid house set in any case not more than 15 bags. If stacked higher than this the pressure on the bottom bags is liable to burst at or form clad in damp water apart from handling difficulties because of their height.
- 106.11 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 twine or cord to the end bags in the bottom most tier of the days pile, tacking the two places of cord 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 cord. Dead storage where the cement remains in place for a long time which other consignments of cement come in and out should be avoided.
- 106.12 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.
- 106.13 As a rule cement should not be stored longer than three months and if time is exceeded the material should be retested being needed. Especially in the rainy season prolonged storage should be avoided. If stuck is likely to be held over for more than three months anticipatory measures should be taken to use it on the works.
- 106.14 Cement that has become lumpy 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. Air set lumps that can be broken down to floor with the pieces. If such lumps are innumerable it is easier to screen them out and discard them if the proportion of air cement is considerable. The fine

material after screening should be tested to determine whether it has become defective.

106.15 The cement in bags is stored in high piles for long periods. There is often a slight tendency in the lower layers to harden, caused by the pressure above this is known as warehouse set. Cement in this condition, an every wet not for service and can be reconditioned by letting each drop on a solid surface for using the cement contained.

106.16 All cement concrete shall be machine mixed and machine vibrated.

106.17 The proportions of cement concrete specified in the above schedule are nominal and 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:

Nominal Mix	Cement in bags of 50 Kgs per one Cubic meter (net) of cement concrete
a) 1 : 1.5 : 3	8.84 bags of 50 Kgs.
b) 1 : 2 : 4	6.62 bags of 50 Kgs.
c) 1 : 2.5 : 5	5.30 bags of 50 Kgs.
d) 1 : 3 : 6	4.42 bags of 50 Kgs.
e) 1 : 4 : 8	2.65 bags of 50 Kgs.
g) 1 : 6 : 12	2.21 bags of 50 Kgs.
h) 1 : 8 : 16	1.66 bags of 50 Kgs.

106.18 Theoretical requirement of cement for

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
f) 12mm plastering in C.M. (1:5) & (1:3)	1.02 bags per 10 Sqm.
g) 12mm plastering in C.M. (1:6) & (1:4)	1.02 bags per 10 Sqm.
h) 20mm plastering in C.M. (1:6) & (1:4)	1.02 bags per 10 Sqm.
i) 12mm plastering in C.M. (1:4)	1.08 bags per 10 Sqm.
j) 12mm plastering in C.M. (1:6)	0.72 bags per 10 Sqm.

107 Conditions on Roof Slabs and Stripping time

107.1. The R.C.C. slab laid should be leak proof. After observing for two rainy seasons 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 department. 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 department.

When R.C.C. slab is laid the following tests may be carried out by the contractor at his own cost to prove that the slab is impervious.

- b) After the centering is removed and curing period is over the slab shall be put to test by pouring water to 15 cms. depth and watched carefully for period not less than a week.
- c) If leakage is observed immediate action should be taken to rectify it by the contractor at his own cost and again tested to see that there are no leakages.
- d) The officer observing the leakage test shall issue a certificate to this effect before final bill is made.
- e) The variation thickness of R.C.C. roof slab due to varying spans, or special covering materials should not effect the general roof bed which should be uniform unless otherwise shown in drawings or instructed.
- f) For roof slab to be laid MS hooks to be provided as directed by the department for fixing fans and lighting G.I. pipes of 12mm or 20mm dia meter supplied by the department at site has to be provided in the masonry walls of a concrete at the specified places as directed by the department for making electrical wiring. No payment will be made to the contractor for these sundry items of work.
- g) For roof slabs water has to be stagnated for 15 cms depth for one week to test the leakages if any. If there are any leakages the contractor has to rectify the same as directed by the department at the cost of the contractor. No payment will be made to the contractor on this account either for testing or for rectifications thus stagnated.

107.2. Stripping Time: Forms shall not be struck until the concrete has reached a strength at least twice the stress to which the concrete may be subjected at the 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 these existing on the work. Where possible, the form work shall be left longer as it would assist the curing.

Note 1:- In normal circumstances and where ordinary Portland cement is used form work may generally be removed after the expiry of the following period.

- | | | |
|----|---|---------------------|
| a) | Walls, Columns and Vertical faces - 24 to 48 hours as may be decided by the | Engineer- in-charge |
| | of all structural members | |
| b) | Slabs (props left under) | 3 days |
| c) | Beam soffits (props left under) | 7 days |
| d) | Removal of props under slabs | |
| | i) Spanning up to 4.5 Mts. | 7 days |
| | ii) Spanning over 4.5 Mts. | 14 days |
| e) | Removal of props under Beams & Arches | |
| | i) Spanning up to 6 Mts. | 14 days |
| | ii) Spanning over 6 Mts. | 21 days |

For other cements the stripping time recommended for ordinary Portland cement may be suitably modified.

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

TECHNICAL SPECIFICATIONS

**[INCORPORATED AS PER REQUIREMENT OF THE WORK PUT TO TENDER WITH THE
RELEVANT SPECIFICATION AND NUMBER OF AP STANDARD SPECIFICATION /
SPECIAL SPECIFICATION]**

SPECIFICATIONS

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	2	3
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' grade	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
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

Sl. No	Name of the specification	Specification No. of APSS
1	2	3
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
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
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

Sl. No	Name of the specification	Specification No. of APSS
1	2	3
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
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	Weather proof course for reinforced cement concrete roofing with Lime broken brick aggregate concrete and two courses of flat tiles	809
8.10	Water proof 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
8.16	Roofing with semi-corrugated asbestos cement sheets	816
8.17	False ceilings	817
9.	STANDARD SPECIFICATION FOR PLASTERING, POINTING, WHITE WASHING, COLOUR WASHING, DISTEMPERING AND WATER PROOF CEMENT PAINING ETC.	

Sl. No	Name of the specification	Specification No. of APSS
1	2	3
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 cup-boards 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
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 GI. 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 bituminous 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 ready made wax polish	1219
12.20	Painting cast iron rain water, soil waste and vent pipes and fittings including priming coat	1220
12.21	Lettering with paint	1221
12.22	French polishing.	1222

Sl. No	Name of the specification	Specification No. of APSS
1	2	3
16.	STANDARD SPECIFICATIONS FOR MISCELLANEOUS	
16.01	Bamboo chicks with blue Dungary 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 lighting	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

1.0 PREAMBLE

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

2.0 PART I - GENERAL TECHNICAL SPECIFICATIONS

The following are the general technical specifications normally adopted for construction of buildings/other works. 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 Engineer-in-charge and in case of dispute arising out of the interpretation of the above, the decision of Engineer-in-charge shall be final and binding on the contractor.

3.0 GENERAL INSTRUCTIONS

3.1 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 and shall be stacked properly as directed by the Engineer-in-charge. The areas to be covered with embankments shall be stripped of top soil to required depths to expose acceptable founding strata. Top soil 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 Engineer-in-charge duly taking all necessary precautions prescribed in safety specification given below. Top soil 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-in-charge. 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.

3.2 Safety Specification

- 3.2.1 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.
- 3.2.2 During night, red lights shall be placed on or about all the barricades.
- 3.2.3 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.
- 3.2.4 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.
- 3.2.5 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.
- 3.2.6 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 cutting of such lines the necessary approval shall be obtained from the electrical authorities concerned for demolition work itself.
- 3.2.7 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.
- 3.2.8 All the mains and meters of the building shall be removed or protected from damage.
- 3.2.9 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.
- 3.2.10 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.
- 3.2.11 All nails in any kind of lumber shall be withdrawn, hammered or bent over as soon as such lumber is removed from the structure being demolished, and placed in pipes for future cleaning or burning.
- 3.2.12 All the roads and open area adjacent to the work site shall either be closed or suitably protected.

3.2.13 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.

3.2.14 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 or materials as to render it unsafe.

3.3 Drawings, Instructions, Measurements

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

3.4 Quality of work

The materials, Equipment, tools and plants and workmanship should be of high and acceptable quality conforming to the standard specifications.

3.5 Testing of works and materials

- I. All materials used and works done shall be subject to approval of the Engineer-in-charge.
- II. 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 Engineer-in-charge.
- III. 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 :-

Sl. 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 (underrated) shall be not more than 10mm by "Le Chatelier" method; if it fails, expansion of aerated sample shall be not more

Sl. No.	Description of material	Frequency of test	Allowable limits
			than 5 mm.
	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	One test for 15 Cum or at least on the day of concrete if concrete quantity is less than 15 cum.	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
	b) Aggregate impact value	Once for each source of supply or when ever change in texture is noticed.	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 b) Gradation for masonry c) Gradation for finishing d) Bulk age e) Silt content	One test for every 15 cum. At least once on the day of work -do- Three for each day of work i.e. morning noon and evening At least once on the day of work	Fineness modules : Fine sand limit 2.2 to 2.6 Medium sand limit 2.6 to 2.9 Coarse sand limit 2.9 to 3.2 b) Silt Content : shall be less than 4% by weight
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
5.	STEEL : (F2415 (IS1786-1985)) a) 0.2% proof stress b) Elongation c) Tensile strength	One for each source of supply and once in six months for fresh supply -do- -do-	4150 kg/cm ² (Minimum) Percentage of elongation 14.5% minimum 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	Shall not be less than 40 Kg/cm ²

Sl. No.	Description of material	Frequency of test	Allowable limits
	b) Water absorption	texture is noticed -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

Materials requiring mixing should be measured separately in boxes of appropriate size before being mixed in the specified proportions.

3.8 Storage of Materials

3.8.1 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 here in and those of ISI or IRC, the provisions of these specifications shall prevail.
- 3.9.3 The following codes shall be applicable for the purpose. However the latest revision of these codes shall only be used.
- i) IS:383-1970 - Specification for coarse and fine aggregates from natural sources for concrete. (Second revision)
 - ii) IS:2386-1963 (Part I to Part III) - Methods of Tests for aggregates of concrete.
 - iii) IS: 9103-1979 - Specification for admixtures for concrete.
 - iv) IS:8112-1989 - Specification for 43 grade ordinary port land cement (first revision with amendment No.3.)
 - v) IS:516-1959 - Methods of test for strength of concrete.
 - vi) IS:1121-1974 (Part I to Part IV) - Method of test for determination of strength properties of natural building stones.
 - vii) IS:7779-1975 (Part I to Part III) - Schedule of properties and availability of stones for construction purposes.
 - viii) IS:1077-1976 - Specification for common burnt clay building bricks (Third revision)
 - ix) IS:3495-1976 (Parts I to IV) - Methods of test for burnt clay building bricks (Second revision)
 - x) IS:1003-1977 (Parts I & II)- Specification for timber paneled and glazed door, window and ventilator shutters.
 - xi) IS:432-1982 (Parts I & II) - Specification of mild steel and medium tensile steel bars and hard drawn steel wires for concrete reinforcement.
 - xii) IS:1786-1985 - Specification of Cold - worked steel, high strength deformed bars for concrete reinforcement (revised).
 - xiii) IS:226-1975 - Specification for structural steel (Standard quality) (Fifth revision).
 - xiv) IS:14687-1999 - Guidelines for false work for concrete structures.
 - xv) IS:1597-1967 (Parts 1 & 2) - Code of practice for construction of stone masonry.
 - xvi) IS:2212-1962 - Code of practice for brick work.
 - xvii) IS:2572-1963 - Code of practice for construction of hollow concrete block masonry.
 - xviii) IS:4326-1993 - Code of practice for earthquake resistant design and construction of buildings (Second revision).
 - xix) IS:456-2000 - Code of practice for plain and reinforced concrete (Fourth revision).
 - xx) IS:800-1984 - Code of practice for general construction in steel (Second revision).
 - xxi) IS:3370-1967 (Parts I to IV) - Code of practice for concrete structures for the storage of liquids.

- xxii) IS:1893-1984 - Criteria for earthquake resistant design of structures.
- xxiii) IS:4082-1996 - Recommendations on stacking and storage of construction materials at site (Second revision).
- xxiv) IS:1642-1960 - Code of practice for general engineering drawings (Second revision).
- xxv) IS:696-1972 - Code of practice for general engineering drawings (Second revision).
- xxvi) IS:962-1967 - Code of practice for architectural and building drawings (First revision).
- xxvii) IS:1161-1979 - Specification for steel tubes for structural purposes (Third revision).
- xxviii) IS:816-1969 - Code of practice for use of metal arc welding for general construction in mild steel.
- xxix) IS:3414-1968 - Code of practice for design and insulation of joints in buildings.
- xxx) IS:1331-1992 (Part I & II) - Methods of non-destructive testing of concrete soils : general requirement (third revision)
- xxxi) IS:1904-1986 - Code of practice for design and construction of foundations in soils : general requirement (Third revision)
- xxxii) IS:2502-1963 - Code of practice for bending and fixing of bars for concrete reinforcement.

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 start of work.

3.10.1.3 The Engineer-in-charge, Supervisor 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

3.10.3.1 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)
- 4.1.1 Water should be clean, fresh and free from all chemicals, 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)
- 4.2.1 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 (APSS No. 110)
- 4.3.1 Sand shall be clean river or pit sand of approved quality and free from salt, 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
- 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 Engineer. 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 IS: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 limestone’s and sand stones, shall be well seasoned by exposure to air before use in construction works.
- 4.5 Cement (APSS No. 112 and IS: 456)
- 4.5.1 Any of the following cements may be used with prior approval of the competent authority.

S.No.	Type	Conforming to
(i)	Ordinary Portland Cement 43 Grade	IS : 8112
(ii)	Ordinary Portland Cement 53 Grade	IS : 12269
(iii)	Portland Puzzling Cement 53 Grade	IS : 1489-Part-I

(iv)	Portland Blast Furnace Slag Cement 53 Grade	IS : 455
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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 trade mark. Cement shall be tested in accordance with IS: 4031-1988 and IS : 4032-1988.

- 4.5.2 For concrete made with Portland Pozzolana cement, Portland Blast Furnace Slag cement or mineral admixtures, the setting time and rate of gain of strength are different from those of concrete made with OPC alone. Cognizance of such modified properties shall be taken in deciding de-shuttering time, initial time of pre-stressing, curing period and for early age loading.
- 4.5.3 Compatibility of chemical admixtures and super-plasticizers with Portland Pozzolana cement, Portland blast furnace slag cement and mineral admixtures shall be ensured by trials.
- 4.5.4 Some other properties of concrete such as modulus of elasticity, tensile strength, creep and shrinkage are not likely to be significantly different. For design purposes, it will be sufficiently accurate to take the same values as those used for concrete made with OPC.
- 4.5.5 When storing the bags, the floor should be raised 30 cms., above the ground and stacked in rows not exceeding 10 bags high, 60 cms clear from the walls in a closed water proof building protected from flood, rain and moisture and deterioration in such a manner that easy access and proper inspection and counting is possible.
- 4.5.6 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.
- 4.6 Bricks (APSS No. 102)
- 4.6.1 Bricks for masonry in foundations, walls and other locations shall be common burnt clay building bricks having minimum crushing strength of 40 Kg/cm². 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 color with fine compact uniform texture. Bricks shall be of uniform deep red cherry or copper color. They shall be free from flaws, cracks and nodules of free lime. Water absorption after 24 hours immersion in cold water shall be not more than 20% by weight. They shall not absorb more than 10% by weight of water after immersion for six hours. 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. 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. 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 non porous, 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.

4.8 Steel Reinforcement (APSS No. 126)

4.8.1 Reinforcement shall be free from pitting due to corrosion and free from loose rust, mill scale, paint, oil, grease, adhering earth etc. The over laps in the reinforcement shall be as per IS : 456-2000 wastage in steel will be at the cost of contractor.

4.8.2 The contractor shall procure MS and HYSD rods required for the works, only from the main manufacturing steel units to the prescribed specification of Bureau of Indian Standards or equivalent and licensed to affix to ISI or other equivalent certifications, marks and acceptable to the Engineer-in-charge. The contractor should obtain and furnish from suppliers of steel, necessary ISI test certificate for every consignment of steel, before use on work.

4.8.3 Mild steel bars shall conform to Grade I of IS:432.

4.8.4 High yield steel strength deformed bars shall conform to IS:1786. Binding wire shall conform to IS:280.

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

4.90 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, ships, craze, specks, crawling, 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 or 200mm x 100 mm with a thickness of 6mm. The tiles shall be true to shape and conform to the performance requirements of IS 777 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

5.2.1 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 Engineer and the Contractor shall satisfy the Engineer as to their safety and efficiency. The Engineer 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 bench marks
- 5.5.1 The Contractor shall establish and maintain, to the satisfaction of Engineer, the base lines and bench marks, based on which the works are set out. Where such base lines and bench marks are provided by the Engineer, the Contractor shall maintain these throughout the period of construction without causing any disturbance to them.
- 5.6 Setting out
- 5.6.1 The Contractor shall set out all the works to be executed by him, in line with the standard base lines, position and bench marks and truly as per drawings within the accepted tolerance limits at no extra cost to Owner. The Contractor shall be solely responsible for the 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
- 5.7.1 The Contractor shall carryout 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 Engineer.
- 5.8 Safety of existing work
- 5.8.1 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
- 5.9.1 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 on 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
- 5.10.1 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)
- I. 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.
 - II. 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.
 - III. 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.
 - IV. The heart portion shall be filled with good flat bedded stones set as close as possible, well set in mortar.
 - V. The work on 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)
- 5.12.1 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 be 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 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 APS 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 proportion by adopting a proper bond (preferably either English bond or a Flemish bond) throughout the wall.
- 5.14.3 Every course shall be 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.

Reinforced Half Brick Partition Walls

- 5.14.4 All bricks to be used in the work shall be thoroughly soaked in water before use to prevent absorption of water from the mortar.
- 5.14.5 The cement mortar used for reinforced brick work shall be in cm (1:4) and mortar used shall conform to 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 where ever possible shall be pegged into the mortar joints of main brick walls.

5.15 Reinforced cement concrete (A.P.S.S. 402 & 403)

- 5.15.1 Reinforced cement concrete shall correspond to M25/M20 grade design mix (or M 30 grade where ever specified) as per IS 456 - 2000 .
- 5.15.2 All R.C.C. work shall be carried out in strict accordance with 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.
- 5.15.3 Reinforcement shall be steel and shall be free from corrosion, oil, grease or paint. Bars shall be hooked or bent accurately and placed in position as per design and drawing, and bound together tight using M.S. binding wire properly annexed tying wire.
- 5.15.4 Binders, stirrups, links should be securely wired to the main ring. Reinforcement shall be lap jointed or spliced only if unavoidable. Not more than 33% of the bars as specified in drawing shall be lapped at one section.
- 5.15.5 Proper cover shall be maintained between the reinforcement and the shuttering.
- 5.15.6 All cement concrete shall be machine mixed and machine vibrated.
- 5.15.6.1 The proportions of cement concrete specified in the above schedule are nominal and 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.

Nominal Mix

Cement in bags of 50 Kgs per
one Cubic metre (net) of cement concrete

a. 1:1.5 : 3	8.84 bags of 50 Kgs.
b. 1:2:4	6.62 bags of 50 Kgs.
c. 1:2.5:5	5.30 bags of 50 Kgs.
d. 1:3:6	4.42 bags of 50 Kgs.
e. 1:4:8	3.31 bags of 50 Kgs.
f. 1:5:10	2.65 bags of 50 Kgs.
g. 1:6:12	2.21 bags of 50 Kgs.
h. 1:8:16	1.66 bags of 50 kgs.

5.15.7 The quantity of water shall be varied to suit the moisture content of the aggregate and shall be just sufficient to produce a dense concrete with workability. Workability should be checked at frequent intervals as per IS:1199.

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

5.15.9 Transportation, placing, compaction and curing of concrete.

5.15.9.1 After mixing, the concrete shall be transported from the mixer to the position of placing as rapidly as possible by appropriate means without causing separation or segregation of concrete, maintaining the required workability.

5.15.9.2 Concrete shall only be placed after the Engineer 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.

5.15.9.3 Concrete after depositing should be compacted thoroughly by means of a mechanical vibration. 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.

5.15.9.4 Concreting shall be carried out continuously up to construction joints already planned. Joint shall be kept where shear force is minimum.

5.15.9.5 Rigid supervision shall be maintained for curing the concrete after laying. All exposed faces of concrete shall be kept moist for a minimum period of 21 days by spraying water or using gunny bags.

5.16 CENTERING (FORM WORK) AND SHUTTERING

5.16.1 Shall be substantially and rigidly constructed of steel and shall be true to the dimensions described.

5.16.2 All joints shall be sufficiently tight to prevent leakage of cement grout.

5.16.3 All faulty joints shall be adequately caulked.

- 5.16.4 Shuttering shall be erected true to line and braced and strutted to prevent deformation under the weight and pressured wet concrete and constructional loads, wind pressure and other forces.
- 5.16.5 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.
- 5.16.6 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 a strength of at least twice the stress to which the concrete may be subjected at time of removal of form work. In normal circumstances where ordinary Portland cement is used and adequate curing is done, minimum striking may be as follows :

Type of Formwork Striking Formwork	Minimum Period Before
a) Vertical formwork to columns, walls, beams	16-24 days
b) Soffit formwork to slabs (Props to be prefixed immediately after removal of formwork)	3 days
c) Soffit formwork to beams (Props to be prefixed 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 up to 6 m	14 days
2) Spanning up to 6 m	21 days

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

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

- 5.17.1 The surface of the wall shall be kept wet for 2 hours before plastering.
- 5.17.2 The Mortar in 1:6 proportion 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. 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.
- 5.17.3 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.

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

5.18 Water proof plaster over the roof

- 5.18.1 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.
- 5.18.2 The Mortar to be used shall be of CM 1:3 proportion mixed thoroughly with a standard water proofing material with water repelling properties to ensure non-absorption.
- 5.18.3 Gauges should be put on the floor about ten feet apart to ensure even thickness.
- 5.18.4 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.

5.19 Pointing: (APSS - 906)

- 5.19.1 Cement mortar for pointing shall conform to SS:115 and shall be of 1:3 proportion. The joints in the masonry shall be raked out to a depth not 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.
- 5.19.2 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.
- 5.19.3 Pointing could be either flush pointing, or groove pointing.

5.20 Flooring: (APSS 701 & 702)

- 5.20.1 Flooring shall be with 25.4mm thick Shabad/Cuddapah polished stones laid over a bed of 100mm thick plain cement concrete in 1:5:10 proportion/RCC slab.
- 5.20.2 All the stones in one room shall be preferably of same width. The width of all the slabs in one row must be uniform with longitudinal joints parallel to each other.
- 5.20.3 The joint width shall be kept minimum and the sides of the slab shall be chisel dressed to ensure a correct joint.

Granolithic concrete flooring (APSS No. 701 & 710)

- 5.20.4 The mix proportions for the Granolithic concrete floor topping shall be (1:1:2) (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 20mm

- and the panels into which the floor is divided for laying the Granolithic concrete shall not have any panel dimensions in excess of 1.5m.
- 5.20.5 Flooring in kitchens shall be with Rough Shahabad Stones laid over a bed of 100mm thick P.C.C. (1:5:10) proportion and pointed with CM : 1:3.

5.21 Joinery :

- 5.21.1 Door Frame : M.S. Hollow door frames manufactured by cold roll formed process steel sheet 1.25mm thick bright CRCA conforming to IS 4351-1976 with 105 x 60mm size .
- 5.21.1.2 Fabrication : The steel door frames shall be got fabricated in an approved workshop as approved by the Engineer.
- 5.21.1.2 Mortar Guards: Mortar guards as instructed by the Engineer-in-charge 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.
- 5.21.1.3 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 galvanized mild steel and fixed at 95cm from the head of the frame.
- 5.21.1.4 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.
- 5.21.1.5 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 Engineer-in-charge shall be applied to the exposed surface.
- 5.21.1.6 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 Engineer-in-charge shall be applied to the exposed surface.

5.21.2 Flush shutters for doors :

- 5.21.2.1 Flush shutters (Double/Single) : should be factory made ISI marked confirming to IS 2202-1991 (part-I), 35mm/30mm 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 lapping on all sides.
- 5.21.2.2 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 lapping shall not be less than 45 mm and not more than 75 mm.
- 5.21.2.3 Plywood : used in flush door shutter shall confirm to IS 710 : 1976 with surface requirements confirming to type AB of IS 303 : 1989.
- 5.21.2.4 Cross-bands used in flush door shutter shall confirm to the requirements laid down in IS 710:1976.
- 5.21.2.5 Face Veneers : used in flush door shutters shall confirm to the requirements laid down for veneer for BWP grade plywood in IS 710:1976.
- 5.21.2.6 All Plywood, cross – boards and veneer used shall be treated in accordance with clause 6.1.5.1. of IS 2202 (Part I) : 1991.
- 5.21.2.7 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.
- 5.21.2.8 Internal lapping 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 stile, designated as frame-cum-lapping, when internal lapping and backing are of the same species.
- 5.21.2.9 External lapping 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.
- 5.21.2.10 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 lapping at the meeting of stiles shall not be less than 30mm.
- 5.21.2.11 Shutter shall be shop prepared for taking mortise locks or latches as may be ordered.
- 5.21.2.12 Workmanship and the finish of the face panels shall be in conformity with those specified in IS 303:1989
- 5.21.2.13 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.

5.21.3 Windows

The wood shall be of Sal wood for frames and shutters.

The wood shall be well seasoned, uniformly colored 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

Before fixing in position, the frames shall be inspected and passed by the Engineer. 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 before placed in position. In place of coal tar approved preservative may also be used.

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.

- 5.21.4 Q.C. Clearance : The doors & windows (both frames & shutters) and ventilators should be got cleared by the Engineer / Quality Control agency authorized by the Engineer-in-Charge. 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 of Engineer/ Q.C. agency. The contractor should inform the Engineer/Q.C. agency for testing and clearing at least 7 days in advance.

5.22 NOTES ON MASONRY

- 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 gives 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 course 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 quoin 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.

5.23 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 dry 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 natural color 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.

5.24 Cover Blocks

- a) A cover block is used to separate the reinforcement from the shuttering before concrete is laid 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) This assures a proper bond between concrete and steel and the steel is prevented from rusting.
- 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) A cover block has to be reasonably good for using in R.C.C.
- e) The mortar for preparing cover blocks shall at least be of proportion 1:2.
- f) The block shall be prepared on a clean and level platform by spreading the mortar in the moulds of required size and depth.
- g) 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.
- h) After 24 hours the block shall be removed from the mould and cured for about seven days.
- i) A properly made cover block does not get crushed when the reinforcement is tied over it and during the concreting work.
- j) Use of 20mm stone chips as cover for the reinforcement will not be accepted.

- k) Use of mortar cover blocks ensures long life to steel and to the R.C.C. construction.

5.25 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) This is achieved by using reinforcement spacers or chairs.
- c) For example if the slab is 100 mm thick the reinforcement section shall be 75 mm after allowing for top and bottom cover.
- d) This could be achieved by making a reinforcement chair of slightly lesser size so as to accommodate the chair underneath the top 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.
- g) Apart from ensuring separation to top and bottom steel the chair also takes the load of the movement of workers when concrete is being laid and the reinforcement work does not get disturbed.
- h) Use of chairs in the reinforcement work is a good construction practice.
- i) Use of large sized stones or bricks to separate top and bottom steel will not be accepted.

5.26 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 smooth 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.

6.0 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. Ant termite treatment, before construction in foundation and basement where required shall be done as per I.S. code 6313 Part II 1971.

Chemicals used, the relevant I.S. specifications for the same and their usual concentrations as water emulsions for soil treatment are given in table 201 A of S.S. 201 APSS as furnished below.

6.2 Blasting Operations

Blasting operations when considered necessary shall be resorted to only with written permission of the Engineer-in-charge. 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 4081-1967 shall be followed.

6.3 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 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 building of more than 30M in length specially 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 are 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).

6.4 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 Engineer-in-charge 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.

6.5 Theoretical requirement of cement should be as follows :-

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
f.	12 mm plastering in C.M. (1:5)& C.M. (1:3)	1.02 bags per 10 Sqm.
g.	12 mm plastering in C.M. (1:6)& C.M. (1:4)	0.82 bags per 10 Sqm.
h.	20 mm plastering in C.M. (1:6)& C.M. (1:4)	1.15 bags per 10 Sqm.
i.	12 mm plastering in C.M. (1:4)	1.08 bags per 10 Sqm.
j.	12 mm plastering in C.M. (1:6)	0.72 bags per 10 Sqm.

7.0 ELECTRIFICATION WORKS (TECHNICAL SPECIFICATION)

7.1 INTERNAL ELECTRIFICATION

7.1.1 WIRING INSTALLATION :

7.1.1 Scope

The scope under this section covers wiring installation comprising of

- a) Lighting/Fan/Exhaust Fan/Circuit bell points.
- b) Power circuits and Air Condition circuits.
- c) Circuit wiring.

3.06.1.2 Standards

The following IS standards are applicable.

- a) IS:732-1989- Code of Practice for Electrical Wiring Installation
- b) IS:1646-1961- Code of Practice for Fire Safety of Buildings (General Electrical Installation)
- c) IS:3646 Part I, - Code of practice principles Part II and Part III for good lighting and aspects of design, schedule for values of illumination and glare level and calculation of coefficient of utilization
- d) IS:1985- National electrical code
- e) IS: 2509 - Specification for rigid non-metallic conduits for electrical installations.
- f) IS:3419- Specification for fitting for rigid non-metallic conduits.
- g) IS:5133- Part-I-1969 - Specification for boxes for enclosure of electrical accessories.

- h) IS:694-1977- Specifications for P.V.C. insulated cable for working voltage upto and including 1100 volts.
 - i) IS:8130-1984- Specifications for conductors for insulated electrical cables and flexible cords.
 - j) IS:5561- Electrical power connectors
 - k) IS:3854-1966- Flush type switches
 - l) IS:1293-1967-3 pin plug sockets
 - m) IS:6538-1978- Plugs
- 7.1.1.3 Recessed conduit wiring system with rigid conduits
- a) Type and size of conduit: All rigid non-metallic conduits shall conform to accepted standards and shall be used to corresponding accessories. Conduits shall provide adequate mechanical protection for the enclosed cables and the interior of the conduit shall be free from obstructions. No non-metallic conduit less than 20 mm in dia shall be used. The number of insulated cables that can be drawn into rigid non-metallic conduits are given in separate enclosure (Ref: Exhibit (1) page no. 161)
 - b) Bunching of cables: Unless otherwise specified, insulated conductors of AC supply shall be bunched in separate conduits. For lighting and small power outlet circuits, phase segregation in separate conduits is recommended.
 - c) Conduit Joints: Conduits (metallic) shall be joined by means of screwed couplers and screwed accessories only. In long distance straight runs of conduit, inspection type boxes at reasonable intervals shall be provided. Cut ends of conduit pipes shall have no sharp edges nor any burrs left to avoid damage to the insulation of conductors while pulling them through such conduits.
 - d) Inspection type conduit fittings such as inspection boxes, deep boxes, bends, elbows and tees shall be so installed that they remain accessible for such purposes as with drawl of existing cables or installation of additional cables.
 - e) Metallic switch board boxes shall be fabricated from 1.6mm thick sheet metal of 16 gauge GI sheet and wooden switch board boxes shall be of Teakwood. The switch boards should be flush mounting type. The MS switch boards should be painted with two coats of red oxide and two coats of synthetic enamel paint of approved grade and make before fixing in position.

The switch boxes should be covered with 3mm thick Decolum Hylum cover.
 - f) The chase in the wall shall be neatly made and be of ample dimensions to permit the conduit to be fixed in the manner desired. In the case of building under construction chases shall be provided in the walls, ceiling etc., at the time of their construction and shall be filled up neatly after erection of conduit and brought to original finish of the walls.

- g) The conduits shall be fixed in chases by means of staples or saddles not more than 60 cms apart. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves maintained by bending the conduit pipe itself with a long radius which will permit easy drawing in of conductors. All threaded joints of rigid steel conduit shall be treated with some approved preservative compound to secure protection against rust.
- h) Suitable inspection boxes shall be provided to permit periodical inspection and to facilitate removal of wires if necessary. Minimum size of inspection boxes shall be 75 x 75 mm.
- i) The M.S. switch board boxes, junction boxes etc., should be efficiently earthed with conduit by a suitable means of earth attachment.
- j) When crossing through expansion joints in Buildings, the conduit section across the joint may be through flexible conduits of same size as the rigid conduit.
- k) Wires: Wires shall comply with the following features.
 - Annealed copper conductor, multi strand, PVC insulated, 1100 volts grade cables.
 - The following colour coding shall be followed :-
 Phases - R - Red
 Phases - Y - Yellow
 Phase - B - Blue
 Neutral - Black
 Earth - Green
- l) On each (lighting/Ceiling Fan/Exhaust Fan) circuit not more than 10 points or 800-1000 watts load should be connected. Example:- If on one of the switch boards there are only 4 switches to control 4 lights, other switch board another 3 switches to control lights etc, then for arriving at the circuit length, the shortest distance from circuit breaker in the MCB distribution board to the nearest switch board shall be considered. Inter connections between such switch boards shall be allowed by providing same wires as are used for light points and no measurement in circuit wiring is allowed for such inter connections. A separate conduit pipe has to be provided for running circuit mains and the conduits for light points shall never be used for the same.

For 5 Amps 3 pin on separate board the circuit measurement to first nearest 5 Amps 3 pin socket is considered. No measurement will be separately considered for looping of switch boards in circuit wiring.
- m) The mounting height of switch boards (bottom of MS Box) shall be 4'6" from finished floor level.

The 5 Amps/15 Amps 3 pin sockets with shutter protection shall be at 1 mtr. level.

Wiring for power circuits i.e., 15 Amps 3 pin and AC points shall be provided in separate conduit pipes.
- n) Neat holes shall be punched on MS Switch Board Boxes for conduit pipe entries. Rough, burred holes with chisel shall be avoided. Conduit pipes to

be fixed to MS Switch Board Boxes, MCB Distribution Boards etc., by providing check nut arrangement. Before drawing of PVC insulated cables inside the conduits, ebonite/ nylon bushes to be provided at conduit ends in order to avoid damage to cables during drawing.

- o) 3mm thick Hylum / Decolum covers provided on Switch Boards should be fixed to switch boards by providing brass coated screws and plated cup washers.
- p) Any loose holes on Switch Board boxes and Distribution Boards shall be properly closed, so as to prevent entry of lizards etc.
- q) Whenever cables of size 6.0 Sq.m and above are connected inside switch, socket or MCB, metallic plug point etc, proper type and size of lugs to be crimped to cable leads before making the permanent connection in switches etc.
- r) Telephone/intercom cables shall not be laid in the same conduit where electric lighting/power cables are drawn. Separate conduit pipes to be used for drawing of telephone/intercom cables.
- s) Loose joints with PVC insulation shall be avoided. Wherever possible joints of cables shall be avoided. If found necessary proper type and size of connectors shall be used.
- t) The drop of voltage between the main switch/distant. Terminals and the farthest current consuming apparatus shall not exceed 2% with all devices switched on.

7.1.1.4 Testing

The entire installation shall be tested for

- a) Insulation Resistance
- b) Earth continuity
- c) Polarity of single pole switches

Tests shall be conducted in the presence of Site Engineer. Test results to be tabulated and submitted to the site engineer.

7.1.2 MCB DISTRIBUTION BOARDS, MCB's AND ELCB's:

7.1.2.1 Scope

The scope under this section covers installation comprising.

- a) Low voltage distribution boards

7.1.2.2 Standards

The following IS Standards are applicable

- a) IS:8623- Factory built assemblies
- b) IS:2147-IP42- Protection against ingress
- c) IS:8828-BS-3871- Specification for Miniature CEEP-19 CIRCUIT breakers

- d) IP 20- Protection category
- e) IS:12640-1980- Residual current operated circuit breakers

7.1.2.3 Details

- a) The Distribution Boards shall have vermin, dust, rust proof painting done by powder coating process.
- b) The cables entering the D. Board should be properly bunched and dressed before making connection in MCB's.
- c) Cable glands shall be provided wherever armored cables are connected to switches.
- d) Cable leads shall be provided with proper type and size of lugs crimped to leads before making permanent connection inside MCB's, RCCB's etc.
- e) Permanent circuit identification shall be provided on the distribution boards.
- f) The mounting height of MCB distribution boards etc., (bottom line) shall be 6'-6" from finished floor level.

7.1.3 CABLES:

7.1.3.1 Scope

The scope under this section covers.

- a) Power cables

7.1.3.2 Standards

- a) IS:8130 - Specification for conductors for insulated electric cables
- b) IS:1554-Part I - Specification for Armoured/unarmoured power cables
- c) IS:3961 - Recommended current ratings for cables
- d) IS:5831-1984 - Specifications for PVC insulation and sheeting of electric cables

7.1.3.3 General requirements for cables

- a) Cables should be stranded aluminum conductors for 6mm and above.
- b) L.V. cables shall be 1100 Volts grade.
- c) Cables shall have color coded insulation.
- d) PVC inner and outer sheathing shall be applied by extrusion.
- e) Steel armoring between inner and outer sheathing.
- f) The PVC insulation and sheathing shall confirm to IS:5831-1984.
- g) The armoring for cables upto 16mm² shall be of round steel wire and that above 16mm² shall be of galvanized steel strings.

7.1.3.4 Laying of Cables

- a) Cables if laid underground shall be at a depth of not less than 60 Cms., in a trench. Sand filling shall be provided at the bottom of trench before laying the cable. Bricks shall be provided on either side of the laid cable. Sand filling shall be done to cover the cable laid. Bricks shall be provided on the top. Earth filling shall be done.

M.S. cable identification tags, route indicators embedded in C.C. are to be provided at every 8 meters length of cable laid.

- b) Hume pipe, trenches/tunnels with proper precast slabs to withstand wear and tear of vehicular traffic shall be provided at road crossings.
- c) Cables if laid in the air shall be laid on cable trays and shall be properly clamped to the trays by plated MS. saddles at proper intervals. Cables shall be properly dressed before fixing on the cable trays.
- d) Extra cable loops of minimum 500 mm shall be provided at each end of cables laid.
- e) Cables shall be bent to a radius of 20 times the diameter of the cable with a minimum of 10 times diameter at restricted space.
- f) Control/Telephone cables shall be laid away from power cables on separate cable trays.

7.1.3.5 Testing

Manufacturers test report shall be submitted for tests on cables in accordance with Indian standards specifications.

Cables shall be tested after installation before commissioning by using 1000 Volts Megger and the following readings shall be obtained and tabulated.

- Continuity on all conductors
- Insulation Resistance
 - a) between conductors
 - b) all conductors and ground

The tests shall be conducted in the presence of Site Engineer and results submitted.

7.1.4 CABLE TRAYS AND ACCESSORIES:

7.1.4.1 Scope

The scope covers MS cable trays and cable tray accessories.

7.1.4.2 Standards

(IS. specifications shall be adhered to)

7.1.4.3 Specifications

Material: Hot rolled plain sheets of tested quality "O" grade as per IS 1079.
Thickness of material: 2.0 mm
Cable loading on tray: 50 Kg/MTR
Span between cable tray supports: 1.5 meters to 2.0 Mtrs.
Surface finish: Hot dip galvanizing iron as per IS 2629, minimum 70 microns thickness

Length of cable trays: 2.5 Meters
Width of Cable trays: (outside to outside width to be taken)

- a) Ladder type - Bolted/welded construction 300 mm/450mm/600mm (depending on number of cables to be laid)
- b) Perforated cable trays (Same as above)

7.1.4.4 Sizes of Cable Trays:

- a) Ladder type - Bolted/welded construction

Side rail

- * Flange width 15 mm
- * Depth 70 mm
- * Two coupler holes of 10mm diameter required on each side of side rail
- * Rungs
- * Channel section: 20 x 40 x 20 mm
- * Slot size on rungs: 20 x 10 mm (oblong holes)
- * Interval between rungs not more than 250mm

- b) Perforated type construction

- * Flange width : 30mm
- * Slot size : 20 x 10 mm (oblong)

7.1.4.5 Sizes of Coupler Plates:

- a) Ladder type - Bolted/welded construction
Size: 90 x 45 mm
Thickness of material: 2/2.5 mm
Slot size: 20 x 10mm oblong holes - Two numbers
Round holes 10mm diameter Two numbers
Finish: Hot dip galvanized as per IS:2629

- b) Perforated type construction:
Size: 210mm x 25mm
Thickness of material: 3mm
Slot size: Oblong holes 20 x 10 mm - 2 numbers
Round holes 10mm diameter - Two numbers
Finish: Hot dip galvanized as per IS:2629

7.1.4.6 Hardware for coupler plate: (Electro galvanized)

- a) Hexagonal Head Bolts - 4 Nos.
- b) Plain washers - 8 Nos.
- c) Hexagonal nuts - 4 Nos.

Number of coupler plates per cable tray - Two numbers.

7.1.4.7 Cable tray Accessories:

Material: Hot rolled plain sheets of tested quality "O" grade as per IS: 1079

Finish: Hot dip galvanized as per IS:2629

Minimum bending Radius - 450mm

Tees, Horizontal/vertical elbows, cross and reducers for both ladder type - welded/bolted and perforated construction shall be as per standard manufacturers drawings.

7.1.4.8 Erection

Cable trays shall be erected on walls, trenches (if necessary) by drilling holes in the wall by power drilling machine. Cable Tray shall be fixed to wall by providing proper size Anchor expandable type bolt and nut arrangement.

Proper type of cable tray accessories shall be selected depending on the site condition.

7.1.5 CABLE TERMINATION:

Cable gland body shall be made of brass castings and machined to final size. The general construction of the glands should be as per standard manufacturer's drawings. It mainly consists

- a) Compression Nut - Brass - 1 No.
- b) Gland body with Hexagonal head - Brass - 1 No.
- c) Rubber Ring - Rubber - 1 No.
- d) Brass washers - Brass - 3 Nos.
- e) Check nuts - Brass - 1 No.

Metal parts of the gland shall be free from blow holes and surface shall be machined smoothly.

All edges shall be debarred and then nickel plated wherever necessary. The cable glands shall be of single compression type.

7.1.6 L.T. PANEL BOARDS

3.06.6.1 Scope

The Scope covers the requirement of designs, construction, assembly, testing, Supply and installation of Panel Boards.

- 7.1.6.2 Standards:
IS:4064 - Code of practice for switch of use units.
IS:4237 - General requirements for switch gear and control gear for voltages not exceeding 1000 Volts.
IS:2147 - Degree of protection provided by enclosures for low voltage switch gear. for cables
IS:9224 - Fuse class category
IS:2705 - Current Transformers
IS:1248 - Indicating Instruments
IS:375 - Marking and arrangement of bus bars
IS:3156 - Voltage Transformers
IS:3231 - Relays
IS:722 - Integrating Information
IS:6975 - Control Switches and push buttons
IS:2959 - Auxiliary contactors
IS:2516 - Air circuit Breakers
IS:2208 - HRC fuse links
IS:8623 - Factory Built Assemblies of switch gear and control gear.

7.1.6.3 CONSTRUCTION:

The panel board shall be:

- i) of the metal enclosed, indoor, floor mounted, free standing type.
- ii) be made up of the requisite vertical sections, which, when coupled together shall form continuous dead front switchboards.
- iii) provide dust and damp protection, the degree of protection being no less than IP, 51 to IS. 2147.
- iv) be readily extensible on both sides by the addition of vertical sections after removal of the end covers.

7.1.6.3.1 The panel boards shall be constructed only of materials capable of withstanding the mechanical, electrical and thermal stresses, as well as the effects of humidity, which are likely to be encountered in normal service.

7.1.6.3.2 Each vertical section shall comprise:

- i) A front framed structure of rolled/folded sheet steel channel section, of minimum 2 mm thickness, rigidly bolted together. This structure shall house the components contributing on the major weight of the equipment, such as circuit breaker fuse switch units, main horizontal bus bars, vertical risers and other front mounted accessories.

The structure shall be mounted on a rigid base frame of folded sheet steel of minimum 2mm thickness and 100mm height. The design shall ensure that the weight of the components is adequately supported without deformation or loss of alignment during transit or during operation.

- ii) A cable chamber housing the cable and connections, and power/control cable terminations. The design shall ensure generous availability of space for ease of installation and maintenance of cabling, and adequate safety for working in one vertical section without coming into accidental contact with live parts in an adjacent section.
 - iii) Front and rear doors fitted with dust excluding neoprene gaskets with fasteners designed to ensure proper compression of the gaskets. When covers are provided in place of doors, generous overlap shall be assured between sheet steel surface with closely spaced fasteners to preclude the entry of dust.
- 7.1.6.3.3 The height of the panel should not be more than 2400 mm. The total depth of the panel should be adequate to cater for proper cabling space.
- 7.1.6.3.4 Doors and covers shall be minimum 1.5mm thick sheet steel. Sheet steel shrouds and partitions shall be of minimum 1.5mm thickness. All sheet steel work forming the exterior of switch boards shall be smoothly finished, levelled and free from flaws. The corners should be rounded.
- 7.1.6.3.5 The apparatus and circuits in the panel boards shall be so arranged as to facilitate their operation and maintenance and at the same time to ensure the necessary degree of safety.
- 7.1.6.3.6 Apparatus forming part of the panel boards shall have the following minimum clearances:
 - i) Between phases - 25 mm
 - ii) Between phases and earth - 25 mm
 - iii) Between phases and earth - 25 mm
 - iv) Between neutral and earth - 19 mm

When, for any reason, the above clearances are not available, suitable insulation shall be provided. Clearances shall be maintained during normal service conditions.

Creep age distances shall comply to those specified in relevant standards.
- 7.1.6.3.7 All insulating material used in the construction of the equipment shall be of non-hygroscopic material, duly treated to withstand the effects of high humidity, high temperature tropical ambient service conditions.
- 7.1.6.3.8 Functional units such as circuit breakers and fuse switches shall be arranged in multi-tier formation, except that not more than two air circuit breakers shall be housed in a single vertical section.
- 7.1.6.3.9 Metallic/insulated barriers shall be provided within vertical sections and between adjacent sections to ensure prevention of accidental contact with:
 - i) Main bus bars and vertical risers during operation, inspection or maintenance of functional units and front mounted accessories.
 - ii) Cable terminations of one functional unit, when working on those of adjacent unit/units.

7.1.6.3.10 All doors/covers providing access to live power equipment/circuits shall be provided with tool operated fasteners to prevent unauthorized access.

7.1.6.3.11 Provision shall be made for permanently earthing the frames and other metal parts of the switch gears by two independent connections.

7.1.6.4 METAL TREATMENT AND FINISH:

7.1.6.4.1 All steelwork used in the construction of the switchboards, should have undergone a rigorous metal treatment process as follows: (Seven tank process.)

- i) Effective cleaning by hot alkaline degreasing solution followed by cold water rinsing to remove traces of alkaline solution.
- ii) Pickling in dilute sulphuric acid to remove oxide scales and rust formation, if any, followed by cold water rinsing to remove traces of acidic solution.
- iii) A recognized phosphate process to facilitate durable coating of the paint on the metal surface and also to prevent the spread of rusting in the event of the paint film being mechanically damaged. This again, shall be followed by hot water rinsing to remove traces of phosphate solution.
- iv) Passivity in de-oxalate solution to retain and augment the effects of phosphate.
- v) Drying with compressed air in a dust free atmosphere.
- vi) Primer coating with two coats of a highly corrosion resistant primer, applied wet on wet & stove dried under strictly controlled conditions of temperature and time.
- vii) A finishing coat of staving synthetic enamel paint to the specified shade of IS.5. The total thickness of paint should not be less than 15 to 20 microns.

7.1.6.5 BUS BARS:

7.1.6.5.1 The bus bars shall be air insulated and made of high conductivity, high strength aluminum alloy complying with the requirements of grade E91 of IS 5082.

7.1.6.5.2 The bus bars shall be suitably braced with non-hygroscopic SMC supports to provide as through fault withstand capacity of 50 KA RMS symmetrical for one second and a peak short circuit withstand of 105 KA minimum. The neutral as well as the earth bar should also be capable of withstanding the above fault level. Ridges shall be provided on the SMC supports to prevent truckling between adjacent bus bars.

7.1.6.5.3 Large clearances and creep age distance shall be provided on the bus bars system to minimize the possibility of a fault.

7.1.6.5.4 High tensile bolts and spring washers shall be provided at all bus bar joints.

7.1.6.5.5 The cross sections of the bus bars risers for various ratings shall have been decided on the basis of temperature rise tests carried out under conditions

closely similar to actual service conditions. For a total operating temperature of 110 deg. C. at an ambient of 40 deg. at the standard current ratings and corresponding cross sections of the main bus bars should be such that the bus bar shall carry 1 Amp. per Sq.mm.

- 7.1.6.5.6 The main phase bus bars shall have continuous current rating throughout the length and the neutral bus bars shall have a continuous rating of at least 50% of the phase bus bars.
- 7.1.6.5.7 Connections from the main bus bars to functional circuit shall be arranged and supported so as to withstand without any damage or deformation the thermal and dynamic stresses due to short circuit currents.
- 7.1.6.5.8 Bus bars shall be color coded for easy identification of individual phases and neutral.
- 7.1.6.5.9 The bus bars shall be suitably supported with epoxy resin mould insulators.
- 7.1.6.6 Tests:
The panel Board shall be inspected as per relevant standards in presence of the Site Engineer and shall include.
 - a) High voltage test
 - b) Insulation test
 - c) Constructional and safety features
- 7.1.6.7 Name Plates:
Main name plates shall be fixed at the top centre. Name plate giving feeder detail shall be provided and are to be fixed by screws.
- 7.1.7 Earth Electrodes:
 - 7.1.7.1 Scope:
The scope included both pipe earth electrodes and plate earth electrodes.
 - 7.1.7.2 Standards:
IS:3043 - Code of practice for earthing
 - 7.1.7.3 Construction:
Pipe Earth Electrode : G.I pipe shall not be less than 38mm diameter and 2½meter long. It shall be buried vertically into the earth pit with the top not less than 1.25 meters below ground level. The G.I pipe should be "C" / "B" class type.

Plate Earth Electrode : Copper plate of 600 x 600 x 3.15 mm. shall be buried in the earth with faces vertical and top shall not be less than 1.5 meters below ground level.

The electrodes shall be surmounted by alternate layers of charcoal or coke and salt. Watering arrangement with ½" G.I pipe with a funnel shall be provided, the later being housed with chamber (masonry) of inner size 300 x 300 mm CI hinged cover with CI frame to be provided on the top.
- 7.1.7.4 Tests:
The resistance of earth electrode shall be less than 5 Ohms.
- 7.1.1.3 (a) Exhibit (I)

MAXIMUM PERMISSIBLE NUMBER OF 250 V GRADE SINGLE-CORE CABLES THAT CAN BE
DRAWN INTO RIGID NON-METALLIC CONDUITS
(Ref.IS:732-1989)

Size of Cable		Size of Conduit, mm					
Nominal Cross- Sectional Area mm ²	Number and Diameter of Wires, mm	16	20	25	32	40	50
		Number of Cables, Max					
1.0	1/1.12*	5	7	13	20	-	-
1.5	1/1.40	4	6	10	14	-	-
2.5	1/1.80 3/1.06*	3	5	10	14	-	-
4	1/2.24 7/0.85*	2	3	6	10	14	-
6	1/2.80 7/1.06*	-	2	5	9	11	-
10	11/3.55+ 7/1.40*	-	-	4	7	9	-
16	7/1.70	-	-	2	4	5	12
25	7/2.24	-	-	-	2	2	6
35	7/2.50	-	-	-	-	2	5
50	7/3.00+ 19/1.80	-	-	-	-	2	3

* For copper conductors only.

+ For aluminum conductors only.

7.2 EXTERNAL ELECTRIFICATIONS WORKS

7.2.1 Underground Cables:

i) Medium and low pressure:

Cables should be double steel tape armored over lead covering and paper insulated or PVC insulated as specified in the schedule of work. All repair joints of cables should be in joint boxes and filling in of the compound shall be done as per IS specifications using best quality materials. All accessories and other materials should conform to I.S. Specification. The jointing work should be carried out by a competent authorized cable joiner. The cables shall be 1100 V grade.

ii) Trench:

Trenches shall not be less than 45 cm wide and 60cm below ground level. Wherever necessary, suitable propping and storing may be done to avoid caving in of the adjoining trench walls. Where the cables cross other services lines adequate protection should be taken to prevent accidental exposure and/or damage to the cables.

iii) Spacing between cables:

Where more than one cable is laid in the same trench the actual space between the cables should normally be 23 cm apart leaving a clear distance of 15cm from the cable and the trench walls.

iv) Laying of cables:

Before the cables are laid, a layer of 3" sand base is to be provided for purposes of cushioning. The cables after being uncoiled and laid into the trench from the rollers should be drawn in straight length. After the cable is laid, it is to be covered with another layer of sand of about 15cm in depth, and the top surface is to be suitably leveled to receive the cable covers which may be of second class bricks or tiles and laid in such manner as to overlap the cables on either sides by at least 5cm. Cable markers of aluminum or G.I. shall be provided at concrete blocks of 3/20cm x 20cm x 5cm and spaced at distance of about 30cm from center to center and at every change in direction. Cables may also be laid in tier formation in the same trench in this case also after the 1st 3 inches of sand cushion, the first tier of cable is laid and sand filled in the trench to form a bed of 23cm above this tier. After this the second cable is laid and the process repeated, the top most tier being at least 45cm below the Ground level. The top cable shall be suitably covered with bricks or tiles. When laying cables, care should be taken to see that the paper insulated cables are bent/straightened slowly, sharp radii being avoided. The minimum safe bending radius for single core cables is 20 diameters and for multicore cables 10 diameters and for armored cables 12 diameters, the diameter being the overall diameter of the cable. Where the cables are required to cross roads they should be normally taken through sleeve pipes at least 10cm in diameter which may be either stone ware, steel or spun reinforced concrete. For more than one cable the diameter should not be less than 15cm. Steel pipes shall be used where it is not possible to obtain sufficient depth to withstand impact from traffic.

v) Cable inside building:

Cables laid inside the building should be properly protected and be carried either in ducts with suitable covers with slabs or chequered plates or fixed to walls by clamps, brackets or cable trays.

vi) Hume Pipes

Wherever cables crossing roads, passages Hume pipes of suitable diameter shall be provided across the road including Civil works of digging, laying of Hume pipes up to a depth of 1 meter and refilling the trench. This shall be properly laid to cover the entire road so as to protect the cables against damage of passing Heavy Vehicles.

vi) Testing the cables:

High voltage tests should be undertaken to ensure that no damage has occurred during the laying operation and that the joints are in order. Cables of 1.1 KV suitable for low and medium voltage should withstand for 15 minutes, 300 volts D.C. current applied between the conductors and between each conductor and sheath. In absence of high pressure testing equipment it is sufficient to test for 1 minute with 1000 volts. If the test results are found to be not satisfactory the contractors shall arrange to replace without any extra cost including removal of rejected materials, Re-laying etc.

- vii) Cable laying & termination shall confirm to IS 1255
- viii) Earthing of cables and cable glands shall confirm to IS 3043
- ix) The cable length given in bill of quantities are approximate and the contractor has to measure exact length of cables to be laid before commencement of work in presence of engineer in charge and give the sizes and quantities required to the engineer in charge to take further action by the engineer in charge. The measurements after laying cables are also to be taken jointly by contractor.

7.2.2 Transformers

The transformers required are intended for use in distribution of power and lighting. The 11 KV / 0.433 volts Transformer required for feeding lighting, pumps, etc.

The transformers shall be designed and manufactured and tested as per IS 2026.

The transformers winding shall be of copper/aluminum winding as specified.

The transformer shall be adequately designed and effectively cooled to ensure its working on full load conditions continuously under short time over load conditions.

The design of core should ensure stability and reduce to a minimum the transformer excitation current and eddy current losses.

The core shall be provided with lugs suitable for lifting the complete core and coil assembly of the transformer.

The transformer coils shall be made of high conductivity copper and insulated with paper of dielectric strength and allow ageing characteristics. The Insulation of the coils shall be treated with suitable insulating material like varnish is to develop full electrical strength of the windings.

The tap changing arrangement shall be provided on the H.T side. The tap changer shall be ON / OFF load type. The tap changing switch shall be mechanically coupled to the external operating handle and the operating handle shall be carried through on oil tight gland on the tank side. A register plate clearly indicating the tapping in use shall be fixed to the external operating mechanism and provision shall be made for securing and padlocking the switch in any of the working position and to ensure that contacts are fully engaged

before the transformer is energized. The range of ON / OFF Load tap change shall be +21/2% to + 5%.

i) Bushing

The Bushing Insulators of the transformers shall be of sufficient creep age length and shall be unaffected by atmospheric conditions due to weather, fumes, alkalis at site.

ii) Insulating oil

Sufficient oil shall be supplied for first filling. The oil shall comply in all respects with pro IS.335.

All accessories like drain valve, oil filling valve, filter valve, oil sampling valve, pressure relief device, oil level indicator, indicating thermometer (dial type) earthing terminal, bi-directional rollers . Exhaust vent, eye bolts, lugs, Diagram and rating plate.

7.2.3 Over head Lines

The specification of over head line covers installation, testing and commissioning of over head lines, distribution lines up to including 11 KV lines, service connections and street lighting works.

Materials

Supports for over head lines and for street lights shall be any of the following types or as specified by Engineer in charge and shall be of adequate strength confirming in all respects to Rule 76 of Indian electricity rules.

Steel tubular poles

This shall conform IS 2713-1964 . This shall be seamless/swaged and welded type as specified and shall be in time stepped sections. Unless other wire specified 1/6th from the base length of the pole plus 15cm be coated with black bitumen paint both internally and externally. The remaining portion of the pole shall be painted with one coat of red oxide on its external surface. The pole shall be complete with cap and base plate.

Steel poles (RSJ Joists)

These shall be I section steel rolled poles confirming to IS standards and Medium weight. The height of the pole shall not be less than 9mts and the pole shall be fixed below ground level not less than 5 feet. The size of overhead line steel RS Joist pole shall be concreted in 1:3:6 cement concrete and painted as per steel tubular poles given above.

Priestesses Cement Concrete Poles (PSCC)

PSCC poles shall be of 8.0 Mts. / 9.0 Mts. Height and shall confirm to standards of AP Transco. / AP DISCo.

'D' Iron Clamps

Where so specified in the contract conductors shall be spaced vertically supported on shackle which one attached to the pole by means of 'D' sloped clamps made of M.S flats of size not less than 50x6mm and galvanized set the dimensions of 'D' shall be such as to hold 75mm high and 90mm dia (minimum size) shackle insulators. The 'D' iron clamp shall be complete with pole clamp with necessary bolts nuts and washers and bolts holes. Clamps shall also provided for pin insulators as in case of vertical formation.

G.I strap

Where 'D' Iron Clamps are not Specified, a pair of strap Plates of galvanized Iron of size 40mm x3mm and length of 23cms. Shall be used with shackle insulators. The pole clamp shall be treated with one coat of red oxide Primer before erection and finished with two coats of approved paint after erection along with other hard ware as specified. The nuts, bolts, for pole clamp shall be of G.I/ cadmium passicated/galvanised.

Stay / Strut Set

A stay set shall consist of stay rod, anchor plate, bow tightened or turn buckle, thimble, stay wire, and strain insulator. The stay rod shall be with stay grip in case of turn buckle is used instead of bow tightened. The stay wire shall be either 7/4.00mm dia or 7/3.15mm dia. G.I as specified in the contract confirming to IS-2141-1968 grade 2. The anchor plate shall be of M.S. galvanized and not less than 30cms x 30cms x 6.4mm thick and size of stay rod shall be not less than 1.8m (6 feet) long and 19mm dia.

Insulator

Porcelain insulator shall conform to IS 1445-1966 suitable for over head lines for power lines below 1000V and IS 731-1971 for overhead power lines greater than 1000V. This shall be vitreous through out and non absorbent. The exposed surface shall be glazed. Insulator shall have adequate mechanical strength high degree of resistance to electrical puncture and resistance to climatic and atmospheric attack.

The insulator shall be of the following types as specified.

- a) Pin and shackle insulators for L.T and HT lines.
- b) Pin and disc type for HV lines.

The minimum size of shackle insulators shall be 65mm dia 100mm high. The pin insulators shall be suitable for 12mm cordeam thread and shall be complete with G.I. pin, nuts & washers.

Binding Materials

Binding of conductors with the insulators shall be done with 12 SWG soft/Aluminum conductor.

Guard Wire

Guard wire shall be G.I.

It shall have minimum breaking strength of 635kg in accordance with Rule 38 of I.E Rule. It shall also be sufficient current carrying capacity to ensure rendering of guard line.

Earth Wire

The size of the continuous earth wire shall not be less than 8 SWG. G.I.

Section Stay

A stay shall be provided at all angle or terminal poles.

The stay rod with the anchor plate shall be embedded in cement concrete 1:3:6 (1 cement = 3 coarse : 6 graded stone) and not less than 0.28 cu.m in content in such away to prevent uprooting of the stay rod.

The stay wire shall also be connected and bonded properly to the continuous earth wire.

Double stays shall be provided at the all dead ends of the pole.

Jumpers

While stringing conductors a sufficient length should be kept at shackle termination for making Jumpers.

Guarding

All road crossing, crossings, of overhead lines, and between HV & LV lines carried on the same support, guard shall be provided.

The guard wires shall be bonded to earth wire.

Cage guard shall be provided for distribution lines of vertical configuration.

7.2.4 Lighting Arrestors

Lightening arrestors shall confirm to IS 3070 - 1965 part I and IS - 3070 - 1966 part-II as applicable. The lightening arrestors system shall confirm to Rule 92 of IE Rule.

7.2.5 Service Connection by Underground Cables:

The service cables from an overhead distribution live shall be fixed to the support with 2 No's of clamp of M.S. flat size 50mm x 6mm. This shall be protected up to a height of 3m from ground level by a G.I. pipe of adequate size clamped to the support with 2 No's of flats of size 50mm x 6mm. The cable shall be laid through pipes while crossing roads, pavements, masonry etc.

7.2.6 ACSR Conductors

Conductors shall be of the following types.

Aluminum conductor steel reinforced (ACSR) This shall comply with the requirements of I.S. 398 - 1961.

The physical and electrical properties of the above conductors shall be in accordance with the specifications as per IS. These conductors shall have a breaking strength of not less than 350kg.

Necessary precautions during storage and handling shall be taken to avoid damage to the conductors.

7.2.7 Testing

All panel boards, switch boards, transformers, over head lines, cables, switches, main switch boards, shall be prop early tested with mugger, test lamps for voltage, Insulation, and values shall be submitted to site electrical Engineer before commissioning pressure test of approximate standard shall be carried out on equipment, on overhead lines, cable panel boards etc.

The H.T. side of transformers shall be tested with 1000V mugger and L.T. side of equipment, overhead lines, cables with 500V mugger. The earth pits shall be tested with earth mugger. All results shall be carried out at site in presence of electrical Engineer and report shall be submitted to him in triplicate and also to the consultant.

All test certificates Transformers, main panel boards, main switch boards, cables, overhead lines, sub distribution boards shall be supplied in triplicate to the site electrical Engineer as well as to consultant. All meters shall be properly working without damages.

7.2.8 Commissioning

All the equipment, transformers, cables, panel boards, overhead lines can be commissioned only after the pressure/mugger tests are found satisfactory. The equipment, cables, overhead lines, panel boards, transformer etc shall be energized in presence of Engineer and consultant after satisfactory presence/mugger tests.

7.3 Contractor

The contractor for electrical works executing substations, earthling, transformers, lighting shall hold valid class 'A' license issued by Andhra Pradesh electrical licensing board and he should submit his license copy and his previous experiences along with the tenders and also before commencement of work The contractor shall quote and employ the number of electrical engineers, supervisors, wiremen in his position for such type of works, who are processing necessary permits/certificates/licenses.

Liquidated damages will be levied in case of failure to complete the job in time as per standard clauses.

The contractor shall be able to read the drawings and prepare the drawings as per site conditions and any modifications necessary for submissions to the electrical inspector.

The contractor shall have liaison with APSEB officials and electrical inspectors, get the drawings and installations approved and also getting power supply released from APTRANSCO.

It is complete responsibility of the contractor to get the electrical inspector's approval, including and getting power supply. He should have good liaison with APTRANSCO.

The contractor can strictly follow the drawings and specifications for carrying out the works and he can get clarifications from site Engineer or Consultant in case of doubt. The contractor shall submit three copies of drawings for conduit routing inside the building, which he is going to carry out and submit one copy to consultant and two copies to client. This also includes the point wiring, telephone point conduit and power plug wiring conduit for each building before starting of the civil works at least one week in advance for verification by client and consultant. The contractor shall also give the total quantity of various conduit to be used in each building before starting work as well the quantity of various wires to be used for each building.

The contractor should plan properly for all electrical material and works entrusted to him 15 days in advance and in form the Engineer in charge and consultant about his work progress. He should co- ordinate with civil persons for recessed conduct laying and also switch boards recessed fixing and any other electrical work associated with civil works as well as electrical Engineer at site and electrical consultant for his works.

7.4 Standards for Electrical Equipment

7.4.1 Unless other wise stipulated in this specification, all equipment or material covered under this specifications shall be designed, manufactured and tested in accordance with the latest standards of Indian Standard's specifications.

7.4.2 All equipment shall conform to latest Indian electricity Rules, Indian electricity act and Indian Insurance rules as regard safety, earthling and other essential provisions specified in for installation and operation of electrical equipments.

7.4.3 Extreme care shall be taken to make enclosures for switch gears proof against rodents, lizards and other creeping vermin.

7.4.4 Continuity of power supply is to be given maximum consideration and the design of the equipment shall be such as to simplify inspection maintenance and testing at site. The design shall include all reasonable precautions and provisions for safety of operating personnel and maintenance personnel.

7.5 COMPLETETION CERTIFICATE :

7.5.1 After completion of the work the contractor should submit completion certificate in the following format :

I/We certify that the installation detailed below has been installed by me/us and tested and that to the best of my/our knowledge and belief, it complies with Indian Electricity Rules 1956.

Electrical installation at

Voltage and system of supply

Particulars of Works :

- a) Internal Electrical Installation.
- | No. | Total Load | Type of system of wiring |
|-----------------|------------|--------------------------|
| i) Light point | | |
| ii) Fan point | | |
| iii) Plug point | | |
| 3-pin 5 A | | |
| 3-pin 15 A. | | |
-
- | b) Others | Description | hp/kW | Type of starting |
|-------------------|-------------|-------|------------------|
| 1) Motors : | | | |
| i) | | | |
| ii) | | | |
| iii) | | | |
| 2) Other plants : | | | |
- c) If the work involves installations of over head line and/or underground cable.
- 1)
 - i) Type and description of overhead line
 - ii) Total length and No. of spans
 - iii) No. of street lights and its description.
 - 2)
 - i) Total length of underground cable and its size
 - ii) No. of joints :
 - End joint :
 - Tee Joint :
 - Straight through joint :

Eating :

- i) Description of earthling electrode
- ii) No. of earth electrodes
- iii) Size of main earth lead

Test Results :

- a) Insulation Resistance
- i) Insulation resistance of the whole system of conductors to earth Megohms.
 - ii) Insulation resistance between the phase conductor and neutral.
 - Between phase R and neutral Megohms.
 - Between phase Y and neutral Megohms.
 - Between phase B and neutral Megohms.
 - iii) Insulation resistance between the phase conductors
 - Between phase R and neutral Megohms.
 - Between phase Y and neutral Megohms.
 - Between phase B and neutral Megohms.
- b) Polarity test :
Polarity of non-linked single pole branch switches.
- c) Earth continuity test :

- Maximum resistance between any point in the earth continuity conductor including metal conduits and main earthing lead Ohms.
- d) Earth electrode resistance :
Resistance of each earth electrode.
i) Ohms.
ii) Ohms.
iii) Ohms.
iv) Ohms.
- e) Lightning protective system.
Resistance of the whole of lightning protective system of earth before any bonding is effected with earth electrode and metal in/on the structure Ohms.

Signature of the Supervisor
Name and Address

.....
.....
.....

Signature of Contractor
Name and Address

.....
.....
.....

7.4.7 LIST OF MAKES FOR WATER SUPPLY AND SANITARY ITEMS TO BE USED.

Sl.No.	Item	Makes Suggested
1.	CI pipes	BPL / INDO / BIC / BIF / or any other equivalent ISI marked makes.
2.	GI pipes	Zindal / Tata / Zenith / or any other equivalent ISI marked makes.
3.	GM Valves	Zolota / Zenith / Anchor or any other ISI marked makes.
4.	Cast Iron Valves	IVC / Kirloskar / Durga or any other ISI marked makes
5.	HDPE Pipes	Superflow / Godavari / Premier Plastics or any other equivalent ISI accredited / ISI marked makes.
6.	PVC pipes	Phenalex / Sudhakar / Nandi or any other ISO accredited / ISI marked makes.
7.	Wash Basins	Parry ware / Neycer / HSW or any other ISI marked makes.
8.	IWC	Parry ware / Neycer / HSW or any other ISI marked makes.
9.	EWC	Parry ware / Neycer / HSW or any other ISI marked makes.
10.	Porcelain Flush Tanks	Parry ware / Neycer / HSW or any other ISI marked makes.
11.	Urinals	Parry ware / Neycer / HSW or any other ISI marked makes.
12.	Pillar / Bib / Stop cocks	Seiko / Reico / Jaquar or any other equivalent makes.
13.	EWC	Parry ware / Neycer / HSW or any other ISI marked makes.

7.4.8 LIST OF MAKES FOR CIVIL ITEMS TO BE USED.

Sl.No.	Item	Makes Suggested
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1.	Cement	Ultra Tech / Ramco / Priya / Rajashree / Birla / Kesoram or any other ISI marked or ISO accredited makes.
2.	Steel	Rashtriya Ispat Nigam Limited , Visakhapatnam Steel Plant, Visakhapatnam / TATA Steel / SAIL or equivalent ISI marked approved make
3.	Ceramic Tiles	
	(a) Dadoing Tiles	Jhonson / Somani / Kajaria or any equivalent ISO accredited makes.
	(b) Flooring Tiles	Jhonson / Somani / Kajaria / Spartek / Regency or any equivalent ISO accredited makes.
4.	Flush Door Shutters	Kutti / Anand / Raveela / Subhdwar or any equivalent ISI marked makes.
5.	Aluminium Fixtures for wood and iron works	Jyothi / Classic / Oxford or any other ISI marked makes.
6.	Aluminium Sections	Jindal / Hindalco or any other equivalent makes.
7.	M S Tubes	TATA / Khandelwal / Zenith or any other equivalent makes.
8.	GI Sheets	Jindal / TATA or any other equivalent makes.
9.	Paints	
	a) Synthetic enamel paint, Oil Bound distemper	ASIAN / NEROLAC or any other ISI marked makes
	b) White primer coat external walls	JK / BIRLA or any other ISI marked makes

DRAWINGS

1.0 DRAWINGS:

- 1.1 The plans enclosed with the tender are only for tender purpose and 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 Superintending Engineer / Executive Engineer progressively according to the work program submitted by the contractor and accepted by the Superintending Engineer / Executive Engineer. 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 Superintending Engineer 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 in issue of drawings, for any particular stage of work the contractor shall be granted extension of time as per clause No. 27 of General Conditions of Contract.
- 1.3 Signed drawings above shall not be deemed to be an order for work unless they entered in the agreement and schedule of drawings under proper alterations has been sent to the contractor by the Engineer-in-charge with a covering letter confirming that the drawing is 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 in the absence of any written order from the Engineer-in-Charge. Acceptance for such work will be at the discretion of the Engineer-in-charge.

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.

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
13.	SANITARY WORKS AND ROOF PLUMBING	
13.01	Stoneware pipes and fittings	1301
13.02	Cast iron pipes & special castings for water & Sewage	1302
13.03	Galvanised mild Steel Pipes & Fittings	1303
13.04	Concrete & pre-stressed Concrete Pipes & Collars	1304
13.05	Asbestos Cement Pressure Pipes & Fittings	1305
13.06	Unplasticised (Rigid) PVC pipes and fittings for potable water supplies	1306
13.07	Polyethylene pipes and fittings for potable water supplies	1307
13.08	Cast iron manhole covers & frames intended for use in drainage works	1308
13.09	C.I. Surface boxes for sluice valves, fire hydrants and air valves	1309
13.10	C.I. Grating for drainage works	1310
13.11	Sheet metal rain Water Pipes, gutters, fitting & accessories	1311
13.12	C.I. Rain water pipes and fittings	1312
13.13	Asbestos cement rain water pipes, gutters and fittings (spigot and socket type)	1313
13.14	Asbestos cement soil, waste and ventilating pipes and fittings	1314
13.15	C.I. Soil, waste and ventilating pipes & fittings	1315
13.16	Handling, transport and custody of pipes, fittings valves etc.	1316
13.17	Trench work excavation and back filling	1317
13.18	Laying and Jointing of glazed stoneware pipes and fittings	1318
13.19	Laying & Jointing of C.I. pipes, fittings & fixing accessories	1319
13.20	Laying & Jointing of Galvanised mild steel pipes & fittings	1320
13.21	Laying & jointing of cement pipes	1321
13.22	Laying & jointing of AC pressure pipes & fittings	1322
13.23	Laying & jointing of Unplasticised (Rigid) PVC pipes and fittings for potable water supplies	1323
13.24	Disinfection of water mains before commissioning	1324
13.25	Construction of manholes, flush tanks & other masonry works on sewers	1325
13.26	Fixing and Plumbing of sanitary fittings	1326
13.27	House Drains Connection – Construction	1327
13.28	fixing of rain water gutters & down take pipes for roof drainage	1328

DRAINAGE, SEWERAGE, WATER SUPPLY, PLUMBING ETC.

1.0 DRAINAGE, SEWERAGE, WATER SUPPLY, PLUMBING ETC.

1.01 General

- 1.01.1 All water supply, drainage and sanitary work shall be executed by a licenced or authorised plumbing supervisor or licenced or authorised plumber and shall be in accordance with the requirements of relevant bye-laws of-municipal or other authorities in whose jurisdiction the work is being carried out.
- 1.01.2 All items such as earthwork excavation, concrete, brick work, stone work, painting, etc., relevant specifications for those shall apply unless otherwise specified.
- 1.01.3 Unless otherwise specified, all exposed work such as cisterns, brackets etc., shall be painted with synthetic enamel paint of approved colour in two coats over a priming coat.

- 1.01.4 The diameter of pipes and fittings wherever mentioned shall mean the internal diameter of nominal bore unless otherwise specified.
- 1.01.5 The job shall include the cost of making necessary chases, grooves, holes etc, in walls, floors and in other places and also making good or completion of the works. ANY DAMAGE caused to floors, walls etc., during the execution of the sanitary and plumbing works shall be made good by the Contractor at his own cost to the satisfaction of the Engineer-in-charge.
- 1.01.6 All the water supply and sanitary connections are to be tested against leakage and satisfactory performance based on standard tests before they are fixed.

GENERAL SPECIFICATIONS

Sl.No.	Description	IS.No. and as amended from time to time
A) LIST OF INDIAN STANDARDS		
I. PIPES & FITTINGS FOR SANITARY, PLUMBING, DRAINAGE		
1	Lead Pipe	IS 404:1993
2	Lead sheet	IS 405:1992
3	Pre-cast Concrete pipes with or without reinforcement – Specifications	IS 458:2003
4	Specification for Salt-glazed stone ware pipe and fittings	IS 651:1992
5	Method of test for concrete pipes.	IS 3597:1998
6	Specification for Caulking lead.	IS 782:1978
7	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage.	IS 1536:2001
8	Vertically cast iron pressure pipes for water, gas and sewage.	IS 1537:1976
9	Cast iron fittings for pressure pipes for water, gas and sewage	IS 1538:1993
10	Specifications for Centrifugally Cast (Spun) Ductile Iron Pipes for Water, Gas and Sewage	IS 8329:2000
11	Specification for high density polyethylene pipes for potable water supplies.	IS 4984:1995
12	Mild steel tubes and tubulars.	IS 1239
13	Specification for Chemically resistant salt-glazed stone ware pipe and fittings.	IS 3006:1979
II WATER SUPPLY FITTINGS		
1	Specification for Pillar taps for water supply purpose	IS 1795:1982
2	Specification for Plug cocks for water supply	IS 3004:1979
3	Washers for use with fittings for cold water services.	IS 4346:1982
4	Specification for Self closing taps for water supply	IS 1711:1984
5	Specification for cast copper alloy screw down bib taps and stop valves for water services.	IS 781:1984
6	Water meter boxes domestic type.	IS 2104:1981
7	Water fittings - Copper alloy float valves (horizontal plunger type) - Specification	IS 1703:2000

Sl.No.	Description	IS.No. and as amended from time to time
8	Specification for copper alloy gate, globe and check valves for water works purposes .	IS 778-1984
III	SANITARY FITTINGS	
1	Vitreous sanitary appliances (Vitreous china)	IS:2556
2	Specification for Glazed fire clay sanitary appliances.	IS 771: 1979
3	Flushing cistern for water closets and urinals.	IS 774:2004
4	Brackets and supports for wash basins and sinks	IS 775:1970
5	Wooden water closet seats and covers.	IS 776:1962
6	Plastic seats and covers for water closets	IS 2548:1996
7	Waste plug and its accessories for sinks and wash basins.	IS 3311:1979
8	Non ferrous waste fittings for wash basin and sink.	IS 2963:1979
IV	LAYING OF PIPES	
1	Code of practice for water supply in buildings.	IS 2065:1983
2	Code of practice for building drainage.	IS 1742:1983
3	Code of practice for laying of cast iron pipes.	IS 3114:1994
4	Code of practice for laying of glazed stone-ware pipes.	IS 4127:1983
5	Laying and jointing of polyethylene pipes and PVC pipes parts- I to III	IS 7634:
6	Laying of D.I pipes	IS 3114: 11500
7	Code of practice for laying concrete pipes.	IS 783 :1985
V	ROOF DRAINAGE SYSTEM	
1	Cast iron rain water pipes and fittings.	IS:1230:1979
2	Specification for Asbestos cement building pipes, gutters and fittings (spigot and socket type)	IS 1626:1994
3	Cast iron/Ductile iron drainage pipes and fittings	IS 1729:2002
4	Specification for Centrifugally cast (spun) iron spigot and socket soil, waste and ventilating pipes, fittings and accessories.	IS 3989:1984
5	Code of practice for fixing rainwater gutters and down pipes for drainage.	IS 2527:1984
6	Code of practice for building drainage.	IS 1742:1983
VI	TANKS/ MANHOLE COVERS / MISC.	
1	Rectangular pressed steel tanks.	IS 804 :1967
2	Code of practice for design and construction of septic tank	IS 2470:1985
3	Specifications for Cast iron manhole covers and frames	IS 1726:1991

Water supply specification Information

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

1.02 Materials: Materials, fittings and appliances for sanitary and plumbing work, used in the work shall be as specified in the Bill of quantities. The contractor shall submit to the Engineer-in-charge, samples of all materials, fittings and appliances for approval well in advance before starting the work. All materials, fittings and appliances used in the work shall confirm to the approved samples.

1.02.1 Galvanised pipes and fittings: -Galvanised steel pipe, fittings and accessories shall be of tested quality and shall confirm to IS: 1239 - (Part-I) 1968.

1.02.2 Lead Pipe:- Lead pipes shall confirm to IS:404 Weight and thickness of pipes shall be indicated in the drawings or in the Bill of quantities.

1.02.3 Lead sheets: Sheet lead for finishing shall weight at least 30 Kgs. per sq.m. unless specified otherwise and shall confirm IS:405.

Bottle trap shall be of approved quality heavy brass chromium plated trap and made particularly smooth on the inside and shall have minimum 50 mm water seal and cleaning screw at bottom.

1.02.4 Lead trap; Lead traps shall be of the same weight and thickness for lead pipes. Lead traps wherever provided shall have minimum 50 mm water seal and cleaning screw at bottom. Traps shall be connected to wasted pipes with brass cap and lining of required sizes and wiped solder joints.

1.02.5 High density polythelene pipes and fittings: High density polythelene pipes and fittings shall be of tested quality and shall confirm to IS:4984-1972 and IS: 8008

1.02.6 Cast iron pipes and accessories: Cast iron pipes with sockets spigots ends shall confirm to IS:1230 and IS:1729.

1.02.7 IS:8008 : Specification for injection moulded HDPE (Part I to IV) fittings for potable water supplies.

1.02.8 Manhole covers: Manhole covers shall confirm to IS: 1726.

1.02.9 Concrete pipes: Concrete pipes shall be non-pressure type and shall confirm to IS :458 and the type of joints shall be as indicated in the drawings.

1.02.10 Salt-glazed stoneware pipe: Salt glazed pipe shall conform to IS:651 and IS:4006.

1.02.11 Sanitary appliances and non-ferrous fittings: All sanitary appliances and non-ferrous fittings shall be of tested quality and shall confirm to the relevant Indian Standards.

1.03 Joints

1.03.1 Cast iron Pipes: The type of jointing for CI pipes confirming to IS: 1729 shall be socket and spigot either with molten lead wool and gasket confirming to IS:782.

If the joints used are spigot and socket types, the spigot shall be careful centered in the socket by one or more pieces of clean white hemp/spun yarn with about

25mm overlap; sufficient yarn only shall be forced into the socket to leave a correct depth for lead caulking. The pipe shall then be examined again for line and level and the proper depth of each joint shall be tested before running the molten lead. For pouring of molten lead of ring of hemp rope shall be wrapped round the pipe at the end of the socket and the joint shall be covered with stiff damp clay. The rope shall then be removed carefully leaving V shaped large hole at the top of the joint to pour the molten lead. Lead shall be poured in one operation only. After a section of convenient length of pipe has been laid, lead shall be caulked sufficiently with caulking tools and hand hammer till the excess lead is removed and the joint shall be made neat and clean.

The type of jointing CI pipes conforming to IS: 1230 shall be socket and spigot with cement and sand. mortar (1 : 1) and gasket yarn.

The spigot shall be carefully inserted and centered in the socket by and or more pieces of thick clean hemp/spun yarn and shall be forced into the socket to leave a correct depth of 30 mm around for cement mortar. The pipe shall then be examined again for line and level and the proper depth of each joint shall be tested before inserting the cement mortar. The joints shall then be adequately carefully filled with stiff cement and sand mortar (1: 1) and the joints shall be levelled to the edge of the socket. Each joint shall be adequately cured by covering with wet clothes and pouring water at frequent intervals.

The parking ring or washer for the flanged joints shall be rubbed for the full diameter of the flange with proper pipe hole and the holes cut out suitably. The packing shall be smeared with graphite paste or a mixture of red lead and white lead and shall be introduced between the flanges of both the pipes and nuts tight in opposite pairs keeping the longitudinal axes adjoining pipe lines in exactly the same straight line. Lead washers shall be provided along with bolt, to prevent any leakage through bolt holes.

1.03.2 **Stoneware pipes:** The type of jointing for stoneware pipes shall be socket and spigot as indicated on the drawings. The inside of the socket shall be first painted with a layer of cement mortar (1 :2) and a gasket of yarn dipped in cement slurry shall be inserted in the socket of the pipe with in wooden caulking tool and wooden mallet in such a way that the gasket shall fully encircle the spigot with a slight overlap. When the spigot end received the gasket, it shall be wrapped round with two or three turns of treated spun yarn its end before being inserted into the sockets. The rest of the joint shall be then completely filled with cement sand mortar (1 : 1) having very little water and the joint shall be leveled to form a smooth splayed; filled at the angle of 45 degree. All excess of cement mortar left inside the pipe joint shall be neatly cleaned off and the joint shall be adequately cured by covering with gunny bags and pouring water at frequent intervals. In jointing stoneware pipes, care shall be taken that the pipes and kept concentric and the socket especially on the underside, shall be completely filled with cement mortar. Where settlement of earth is envisaged, the joint shall be made with bitumenastic filler or any other materials as approved by the Engineer-in-charge.

1.03.3 **Concrete Pipes:** The type of jointing for concrete pipes shall be with loose concrete collars and the joints shall be packed from other side with spun yarn dipped in cement slurry as specified for jointing stoneware pipes; stiff cement mortar (1: 1) shall be filled from both sides and splayed at an angle of 45 degree on both side, the joints shall be adequately cured as specified for joints in stoneware pipes.

1.04 **Laying of pipes :**

1.04.1 **Cast iron pipes:** The laying of cast iron pipe lines shall commence only after the bottom of the trench at various points have been levelled and aligned in

accordance with the drawings. The sides of the trenches shall be vertical as far as possible and the width of the bottom shall be 300 mm wider than the diameter of the pipe. Where joints are made, the trench shall be widened suitable to provide room for caulking joints. Shorting and Timbering shall not be used without prior approval of the Engineer. For pipes buried in the ground, the Contractor shall take care to maintain always the minimum cushion of earth over the pipes as indicated in the drawings. All pipes, Water mains, cables etc met within the course of excavation shall be carefully protected and supported. All pipes and fittings shall be sounded with a light hammer and checked properly to detect any crack or blow holes before laying. The excavated materials shall be thrown on one side of the trench and the pipes stacked on the other side.

The inside of the socket and the outside of spigot shall be thoroughly cleaned of all foreign matter before laying. The pipes shall be laid with their socket ends facing the directions of the flow. The pipes shall then be lowered in the trenches by a method as approved by the Engineer. The pipes shall then be jointed by caulking as specified in clause 8.01.15. After each section of the pipeline has been laid it shall be tested for water tightness before back filling the trench. On successful completion of testing, the trench shall be backfilled with the excavated earth in layer of 200 mm and shall be watered and rammed. Any subsidence accruing in the line of branches after backfilling shall be repaired by the contractor at his own cost. Where the pipe lines cross roads, the sides of the trenches shall be suitably shored.

1.04.2 **Concrete pipes:** The laying of concrete pipelines shall conform to clause 9 of IS:783. Pipes shall be laid true to line and grade. Laying of pipes shall always proceed up a slope.

1.04.3 **Stoneware pipes:** The laying of stoneware pipeline shall commence only after the bottom of the trench at various points have been levelled as shown in the drawings. The centre line of the trench shall be first marked out on the ground and shall be excavated correct to depth, slope and width at all points. The pipes shall be carefully laid to the alignment, levels and gradients as shown on the drawings. The trench shall be excavated wide enough under the sockets to allow hands to pass for making joints. The pipes between manholes shall be laid truly in straight lines and without any vertical or horizontal deviations on a bed of concrete as shown in the drawings. While laying pipes, portion of concrete under each socket shall be dug and taken off so that the barrel of the pipe gets full support on the concrete bed. Pipes shall be launched with concrete tangentially up to the crown of the diameter of the pipe as shown on the drawing. When it crosses under a road, the pipes shall be fully encased in concrete as shown on drawings. The contractor shall take precautions to maintain always a minimum cushion of earth over the pipes as indicated in the drawings. All pipes shall be carefully examined with a light hammer for soundness before laying. After each section of the pipeline has been laid, the joints shall be allowed to sit properly and shall be inspected and carried out only after approval of the Engineer. After testing, the trench shall be back filled with selected earth in layers of 200 mm and shall be watered and thoroughly rammed all pipes, water mains, cables etc. met within the course of excavation shall be carefully protected and supported.

When the pipelines cross roads, the trenches shall have vertical sides with suitable shoring. Any subsidence in the line of trenches after backfilling shall be repaired by the contractor at his own cost.

1.04.4 **Cast iron rain water pipes:**

Cast iron rainwater pipes shall confirm to IS:1230 and IS: 1729 and shall be installed as shown in the drawings.

Cast iron rainwater pipes fixed exposed to external walls shall confirm to IS: 1230 and shall be blocked out at least 20 mm from the plastered surface by means of cast iron bobbing. The rain water pipes at the roof level shall be fitted with a cast iron band with a masonry bell mouth of suitable size fitted with a cast iron grating. The bottom of the down pipe shall be fitted with a shoe fixed 150mm above ground / apron level of the building as shown on the drawings. The sockets spigots of pipes and fittings shall be joined as specified in clause 8.01.15.

Cast iron rainwater pipes embedded in concrete or masonry shall confirm to IS: 1729 and shall be securely fixed to wall with wooden plugs and nails. Joints of the sockets and spigots of pipes and fittings shall be as specified in clause 8.01.15.

1.05 **Inspection pits and trap pits:**

Construction of pits shall commence only after the pipes have been laid in position to true line and levels as shown on the drawings to the satisfaction of the Engineer.

Inspection Pits: Inspection pits shall be constructed as indicated in the drawings/bill of quantities. Unless otherwise specified, all inspection pits shall be constructed with rubble masonry in cement mortar (1 :4). Half round channels of size suitable for the inlet and outlet pipe diameter shall be formed on the floor of the pit with M-10. The floor on the pit shall be haunched towards the channel as shown in the drawings. Inside pits shall be finished with cement sand plaster as specified in the specification and finished smooth with cement punning. Care shall be taken to avoid invert level after finishing and shall be as shown in drawings and/or as directed by the Engineer.

Inspection/master trap pits: The pits for the glazed stoneware master trap shall be constructed as indicated in the drawings/bill of quantities. The construction and finishing of the pit shall be haunched towards the interception/master trap pits. Gully trap pits shall be constructed as indicated in the drawings/bills of quantities. The construction and finishing of the pit shall be as described in specification for inspection pit. The cast iron grating shall be set flush with the finished ground/ apron level.

1.06 **Testing of Cast Iron Soil and Waste Pipelines:**

On completion of laying the cast iron soil waste and ventilation pipeline shall be tested by the contractor at his own cost and to detect leakage and any other defects in the pipe line.

Test shall be conducted using proper apparatus with attachments for smoke making machine for applying smoke to the pipelines under pressure, jute cotton waste or brown paper soaked in creosote oil shall be used and fixed to obtain dense and pungent smoke. While conducting smoke test top of soil waste and ventilation pipes shall be kept open till smoke starts coming out of openings. The opening shall then be surely plugged with expanding rubber, traps and other openings for connecting sanitary fixtures shall be sealed with water or other approved plugs. The entire pipeline shall be tested in suitable sections as directed by the Engineer. The entire length of the pipelines including all joints under test shall be closely observed for any sign of smoke leakage. All leakage and defects shall be rectified by the contractor to the satisfaction of the Engineer.

- 1.07 Testing of underground Sewer lines:**
The drainage system shall be tested in accordance with the provisions of IS: 1742. All defects and deficiencies detected during the watch shall be promptly rectified by the contractor to the satisfaction of the Engineer.
- 2.0 WATER SUPPLY:**
- 2.01 Jointing and laying of galvanized steel water supply pipes:**
- 2.01.1 Screwed galvanized steel pipes, conforming to IS: 1239 shall be jointed with screwed socket joints and screwed fittings of the same materials as that of the pipes. Any burrs remaining on the pipes and after the threads are cut shall be removed. An approved jointing compound together with a grumet of a few strands of fine yarn shall be used for jointing pipes and fittings. Any pipe threads exposed after jointing shall be painted with white synthetic enamel paint and in the case of underground piping, thickly coated with approved bituminous compound to prevent corrosion.
- 2.01.2 The depth at which the underground water supply pipe is to be laid shall be as shown in the drawings. The service pipe passing into or beneath the building shall be laid at least 200mm below the ground floor level and accommodate in a previously laid sleeve in the structure where it enters the building. The space between the sleeve and the pipe as its entry into the exit from the building shall be filled with bituminous materials for a minimum of 150mm at both ends. Piping shall not be buried in walls or floors as far as possible. However when unavoidable, piping shall be buried for the shortest distance necessary and adequate protection shall be provided against damage.
- 2.01.3 Galvanized steel piping shall be secured by iron or steel clamps and hooks when fixed on walls. All pipe work shall be completely water tight and the joints shall be such that there are no projections of jointing materials or the like in the interior of pipes. Before the pipeline is commissioned, all piping and fittings shall be flushed clean.
- 2.01.4 **Testing:** After the laying and fixing of all galvanised steel water supply pipes and fittings are completed the line shall be slowly and carefully charged with water to a test pressure of 5 Kg. per Sq.cm. or the specified working pressure plus 50% as may be prescribed by the Engineer. Care shall be taken that air in pipelines is completely exhausted while filling the pipelines with water. This pressure shall be maintained for at least one hour, unless otherwise specified. The pipes and fittings shall be inspected for any leakage of water. Defects in pipes and fittings, if detected, shall be remedied by the Contractor at his own cost.
- 2.02 Jointing and laying of high density polythelene water supply pipes:**
All higher density polythelene pipes shall have screwed ends and shall be jointed with screwed fittings of the same materials of the pipes. Any burrs remaining on the pipe ends after cutting threads shall be removed if necessary and approved jointing compound with a few strands of fine yarn may be used for jointing pipes and fittings. All exposed high density polyethelene pipes shall be installed with PVC saddles Screwed on 25mm thick wooden blocks securely fixed on walls, at suitable intervals, not exceeding 1m. Pipes wherever installed on wall, clamps shall be fixed as in the case of galvanised steel pipes.
- 2.03 **Jointing of lead pipes:** Jointing in lead pipes shall be wiped solder joints. Joints shall be wiped in a continuous circular motion in one direction so as to leave a neatly formed elliptical shaped joints free from tears, burns, dropping etc. All

exposed lead pipes, exceeding 25mm in diameter shall be secured to walls by iron clips or lead ears. The spacing of the clips shall not exceed 900mm.

- 2.04 **Storage water tanks:** All tanks for storage of water shall be as indicated in the drawings and bill of quantities and shall be completely and properly covered with dust, light and mosquito proof cover of approved type as shown on the drawings or as described in the bill of quantities. They shall be fitted with a ball valve of approved type, securely fixed to the tank independent of the inlet pipe. A mosquito proof overflow pipe shall be fixed to the tank with the pipe invert about 25mm above the top of water line.

Approved type of stop valve shall be provided for every outlet pipe. All outlet and inlet pipes shall be fixed as shown in the drawings. Support of the tanks shall be 'as indicated in drawings. Inside surface of galvanised steel tanks shall be painted with anti-corrosive drinking water paints as indicated in bill of quantities.

- 2.05 **Cleaning and disinfection:** All storage tanks water supply fittings and pipes before being put into commission, shall be disinfected with liquid chlorine by the Contractor as his own cost.

3.0 **INSTALLATION OF SANITARY APPLIANCES:**

All sanitary appliances shall be fixed in position rigidly on floor and walls as indicated in the drawings/ bill of quantities or as directed by the Engineer.

- 3.1 **Water closet-Squatting type:** Squatting type water closet shall be fitted with specified trap and shall be jointed with gasket yarn and cement mortar. Rim of the pan shall be levelled properly and set flush with the finished floor. The pan shall be connected to flushing cistern of capacity as indicated in the bill of quantities. The flushing cistern shall be supported on pair of CI cantilever brackets firmly embedded in the wall in cement mortar (1:4) or screwed to wall suitable plugs. Heights of the bracket from the top of pan shall be as shown in the drawings. The flush pipe from the cistern shall be 32 mm of specified tested quality and connected to the pan inlet by means of hemp and putty joint.

- 3.2 **Water closet-pedestal type:** Pedestal type water closet shall be rigidly fixed on the finished floor by means of 75mm long brass screw with suitable plugs. The flushing cistern shall be porcelain or PVC or cast iron low level push down cistern of capacity as indicated in the bill of quantities. The cistern shall be supported on pair of cast iron or rolled steel cantilever brackets firmly fixed on wall with brass screws and suitable plugs. The flush pipe from the cistern shall be 40mm dia chromium plated. Brass bend fitted to the closet by means of rubber adopter. The closet shall be provided with double plastic seat cover confirming to IS: 2548 and chromium plated hinges.

- 3.3 **Urinals:** Flat back type urinals shall be firmly fitted. on finished wall by means of 50mm long brass screws and suitable plugs. Height of the lip from the standing point shall be as shown in the drawings. Urinals shall be fitted with specified type of automatic flushing cistern of capacity as described in the bill of quantities and as shown on the drawings. Flushing pipes shall be of galvanised steel pipes of required sizes and connected to the Urinal with 15mm dia. PVC connector fitted with brass cap and lining at one end. The joint to the inlet of urinal shall be neatly finished with putty joints.

SENSOR FITTED URINALS

Flat back urinals shall be fitted with sensors for automatic flushing shall be firmly fitted on finished wall by means of 50mm long brass screws and suitable plugs. height of the lip from the standing point shall be as shown in the drawings. The arrangement of waste pipes and discharge to the floor trap shall be as shown on the drawings or as directed by Engineer. For single urinal, the discharge may be direct to the floor trap through a 40mm dia waste pipe. For range of urinals the discharge may be collected to the common discharge pipe by 40mm dia pipe shall be led to the 100mm SWG half round channel laid on the floor leading to the floor trap.

3.4 Wash hand basin

Wash hand basin shall be fitted in position to true level on a pair of cast iron brackets rigidly fixed on wall with 50mm long brass screws and suitable plugs. The type of waste pipes and their connection shall be as shown on the drawings or as directed by the Engineer.

- 3.5 **Porcelain sink** of size as indicated in the bill of quantities shall be levelled properly and fitted in position on a pair of cast iron cantilever brackets firmly embedded in the wall in cement mortar (1 :4) The sink shall be fitted with chromium plated brass waste fittings of standard size. The type of waste pipes and their connections shall be as shown on drawings. or as directed by the Engineer.

- 3.6 **Other miscellaneous fittings** (e.g. Mirror, towel rails, soap cases etc.) All such fittings shall be of type and sizes prescribed in the bill of quantities and shall be fitted in position true to line, level, and plane as shown on the drawings or as directed by the Engineer.

LIST OF APPROVED MAKES /MATERIALS TO BE USED FOR SANITARY AND WATER SUPPLY ITEMS

SI No	ITEM/ MATERIAL	MAKES
1	CI pipes	BPL / INDO / BIC / BIF
2	GI pipes & Fittings	Jindal / Tata / Zenith/ Oswal
3	GM Valves	Zoloto / Zenith / Anchor
4	HDPE Pipes	Finolex/ Superflow / Godavari / Premier Plastics
5	PVC pipes & fittings	Finolex/ Sudhakar / Nandi
6	Wash Basins	Parryware / CERA / HIND WARE
7	IWC/ EWC	Parryware / CERA / HIND WARE
8	Porcelain Flush Tanks	Parryware / CERA / HIND WARE
9	Urinals	Parryware / CERA / HIND WARE
10	Pillar / Bib / Stop cocks	Seiko / Reico / Jaquar/ Acco/ Leader

I here by agree to use materials from the makes specified against each item

BILL OF QUANTITIES
AND
PRICE BID
(Schedule – A)

NAME OF WORK: Improvements to Mithra campus(IIT SKLM Boys campus) at Chinaravpalli (Vil), Etcherla (Mandal), Srikakulam (Dist).

BILL OF QUANTITIES

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 lump sum 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 Engineer 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 Engineer-in-Charge 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 summarized 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 the useful soils should be used in the nearby embankments.

11. The actual mix proportion by weight to be adopted during execution will be got 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 manual dewatering is involved either for excavation or for foundations or for constructions, the same will have to be carried out by the agency at no extra cost, since the agreement rates are inclusive of dewatering charges.
14. Wherever embankment work is involved, useful soils approved by the Engineer-in-Charge 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 Engineer-in-Charge 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 equipments suitable accommodation for the staff and workmen, with adequate sanitary arrangements, the effecting and maintenance of all insurances, 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 containing therein. These preliminary specifications shall apply to the agreement to be entered into between the contractor and the Government of Andhra Pradesh 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 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 and other documents connected with contract such as estimate plans, specifications, can be seen on all working

days in the office of the Superintending Engineer, APMSIDC, APMSIDC Circle, Guntur

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 Engineer-in-Charge 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 department 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 Engineer-in-charge, in any case, shall be submitted for the Engineer-in-charge'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 is twenty four months plus defects correction period.
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 / B.I.S. specifications, the special specifications appended, Drawings etc.

26. If there is any contradiction between APSS 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 / B.I.S. code and are required to be prescribed, such work shall be carried out in accordance with the written instructions of the Engineer-in-charge.
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 contractors 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.

In the case of discrepancies between the written description of the item in the bill of quantities (Schedule "A") and the detailed description in the specification of the same item, the later shall be adopted

30. The Unit rates noted below are those governing payment of extras or deductions for omissions according to the conditions of the contract as set-forth in the preliminary specifications of the A.P. standard specifications and other conditions of specification of this contract.
31. 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 Executive Engineer 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.
32. 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.
33. 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.
34. The contractor is bound to execute all supplemental works that are found essential incidental and inevitable during execution of main work.
35. The payment of rates for supplement items of work will be regulated as under.

36 a) Supplemental items directly deductible from similar items in the original agreement.

36.b) 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 plus or minus overall tender percentage.

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

a) 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.

36 Extra Items:

36.1 Extra items of work shall not vitiate the contract. The contractor shall be bound to execute extra items of work as directed by the Engineer-in-Charge. The rates for extra items shall be worked out by the Engineer-in-charge as per the conditions of the Contract and the same are binding on the Contractor.

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

37 Entrustment of additional items:

37.1 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 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 competent authority shall be obtained. Entrustment of such items on nomination shall be at rates not exceeding the estimated rates.

37.2 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 - 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.

37.3 Entrustment of either the additional or supplemental items shall be subject to the provisions under para 176 (B) of APWD Code, 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 competent authority. The Superintending Engineer who entered into the agreement approves the rate for the items / variation in quantity in the current agreement.

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

SCHEDULE -A PART - I

NAME OF WORK: Supply and Fixing of MS Grill facility at corridors of hostel buildings located Institute campus of RGUKT, IIIT Srikakulam.

S.No	Approximate Quantity In figures/ words	Description of work	Unit In figures / words	Estimate Rate In figures / words	Amount inRs.
		Schedule - A (PART- I)Enclosed			

Schedule - B
List of Drawings

S.No.	Drawing No.	Description
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- Enclosed -

DECLARATION

I/We hereby declare that I / We have inspected and satisfied myself / ourselves thoroughly and I / We am / are conversant with the local conditions, regarding all materials and about required for the work on which I / We have based my / our rates for the work. The Specifications, Plans, Designs and conditions of contract on which the offer has been based completely studied by me / us before submitting the tender.

TENDERER

SCHEDULE -C

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

Sl.No.	Short Title	I. S. Number
I.	CEMENT:	
1.	43 Grade ordinary port portland cement	8112-1989
2.	Methods of physical tests for hydraulic comments	4031 (Part 1 to 15) - 1988
II.	AGGREGATES :	
1.	Aggregates (Coarse and fine) from natural source for concrete	383 - 1970
2.	Specification for sand for masonry :	2116-1980
3.	Method of tests for aggregates for concrete :	2386 (Part-I to IV) - 1963
III.	BUILDING STONES :	
1.	Method of Tests for determination of strength properties of natural building stones Part - I : Compressive strength Part - II : Transverse strength Part - III : Tensile strength Part - IV : Shear strength	1121 (Part I to IV) - 1974
2.	Quarrying stones for construction purposes, recommended practice	83831-1977
3.	Measurement of buildings and Civil Engineering Works	1200 (Part-IV) - 1976
4.	Stone Masonry: Specifications for dressing natural building stones	1129-1972 (Part – IV)
5.	Drilling and permeability tests	5529 (Part III) - 1973
6.	Code of practice for permeability tests (during and after construction)	11216 - 1985
IV.	STEEL	
1.	Code of practice for bending and fixing of bars for concrete reinforcement	2502-1963
2.	Specifications for High Strength Deformed Steel bars and Wires for concrete reinforcement :	1781-1985
3.	Recommendation for detailing of reinforcement in reinforced Cement concrete works	5525-1969
4.	Mild steel and Medium Tensile steel bars for concrete reinforcement	432 (Part – VIII) – 1982

5.	Measurement of Building and Civil Engineering works Part - VIII Steel works and iron work)	1200 (Part – VIII) - 1993
V.	MASONRY	
1.	Code of practice for construction of stone masonry Rubble stone masonry	1597 (Part-1) - 1992
2.	Measurement of building and Civil Engineering Works Plastering and pointing.	1200 (Part-XII) - 1976
VI.	CONCRETE:	
1.	Measurement of building and Civil Engineering Works method of concrete works	1200 (Part-II) - 1974
2.	Concrete works : Code of practice for plain and reinforced concrete	456 - 1978
3.	Precast concrete coping blocks	5751 - 1984
4.	Method of Testing for strength of concrete	516 - 1959
5.	Specification for Admixtures for concrete	9103 - 1979
6.	Method of sampling and analysis of concrete	1199 - 1976
7.	Concrete mixer - batch type	1791 - 1968
8.	Concrete Vibrators - Immiscible type	2505 - 1980
VII.	EARTH WORK :	
1.	Measurement of building and Civil Engineers Works method for earth work	1200 (Part – 1) - 1974
2.	Safety Code for filling and other deep foundations	5121 - 1969
3.	Safety Code for excavation works	3701 - 1966
4.	Code of practice for earth work on canals	4701 - 1982
5.	Method of testing for soils Determinations of Water content	2720 (Part – II) - 1973
6.	Determination of water content dry density relation using light compaction	2720 (Part-VIII) - 1980
7.	Determination of Dry density of soils in place by sand replacement method (first revision)	2720 (Part – XXVII) - 1974
8.	Determination of dry density of soils in – situ	270 (Part – XXIX) - 1975
VIII.	OTHER SUBJECTS :	
1.	Safety code for scaffolds	3698 (Part – I) - 1968
2.	Safety Code for ladders	3696 (Part – II) - 1966
3.	Recommendation of stacking and storage of construction materials at site	4082 – 1977

SCHEDULE - D
LIST OF I.S. CODES FOR ELECTRICAL INSTALLATIONS
INSTALLATIONS

1.	Electrical wiring installation (system voltage not exceeding 650 V)	IS 732-1989
2.	Graphical symbols used in Electro-technology art-XI-Electrical Installation buildings.	IS 2032-1969
3.	Fire safety of building (General) Electrical Installation	IS 1646-1961
4.	PVC Insulated cables	IS 694-1977
5.	PVC Insulated cables (heavy duty)	IS 1554-1964
6.	5 A tumbler switches	IS 1087
7.	15A tumbler switches	IS 2120
8.	3 Pin plugs and sockets	IS 1293
9.	Aluminum conductors for insulated cables	IS 1753-1967
10.	Recommended current ratings for cables	IS 1961-1967
11.	Installation and maintenance of paper insulated power cables	IS 1155-1967
12.	Earthling	IS 3043-1966
13.	Rigid steel conduits for electrical wiring	IS 9537-P-II-1989
14.	Fittings for electrical wiring	IS 2667-1964
15.	Flexible steel conduits electrical wiring	IS 3430-1966
16.	Accessories for rigid steel conduit insulated cables	IS 3837-1966
17.	A C circuit breakers	IS 2516-1977
18.	Heavy duty air break switches and fuses for voltage not exceeding 1000V	IS 4047-1967
19.	11 KV XLPE cables	IS 7089-part-II
20.	Fuses	IS 9224-p-I & II
21.	Current Transformers	IS 2705
22.	Voltage Transformers	IS 3516
23.	Indicating Instruments	IS 1248
24.	Relays	IS IS - 722
25.	Integrating instruments	IS IS - 3231
26.	Auxiliary contracts	IS 2959
27.	Auxiliary switches and push buttons	IS 6875

28.	A C isolators and earthing switches	IS 1818-1972
29.	Central gear for voltage not exceeding 1000 V	IS 4337-1967
30.	Installation and maintenance of switchgear	IS 3072-1965
31.	Enclosed distribution fuse board and cutouts for voltage 100 V	IS 2675-1964
32.	Air break isolators for voltage 1000 V	IS 2607-1976
33.	Marking alignment or switchgear bushes main Connections and auxiliary wiring	IS 375-1963
34.	Selection installation and maintenance of fuses (Voltages not exceeding 650 V)	IS 3106-1966
35.	General and safety requirements for electric Lighting fittings	IS 1913-1969
36.	Lighting public thorough fares	IS 1944-1970
37.	Waterproof electric lighting fitting	IS 3528-1966
38.	Water tight electric lighting fittings	IS 3553-1966
39.	Luminaries for street lighting	IS 2149-1970
40.	Mild steel tubular and other wrought steel pipe fittings	IS 1239-1968
41.	Ceiling fans	IS 374-1951
42.	Transformers	IS 2026-1962
43.	Installation and commissioning of transformers	IS 1886-1967
44.	Protecting of buildings and allied structures against lightning	IS 2309-1967
45.	Interior Illumination	IS 3636-1966
46.	Bus bar ratings	IS 8084-1976
47.	On load change over switches	IS 4064-1978
48.	Aluminum alloy for bus bars	IS 5082
49.	Factory built assemblies of switchgear and control gear	IS 8623
50.	General requirements of switchgear and control gear for voltages not exceeding 1000 V.	IS 4237
51.	Degree of protection provided by enclosing for low voltage switchgear	IS 2147

LIST OF APPROVED MAKES OF ELECTRICAL MATERIALS

Descriptions	Make
1. Annealed copper conductor, PVC insulated, 1100 volts grade flexible copper cables manufactured to IS-694	Q-Flex, Nicco, Finolex, Pawancab Anchor, Havells, RPG, with FR & ISI marking.
2. PVC insulated aluminum conductor, PVC sheathed, Armored Underground cables to IS 1554-Part-I-1976 or latest revision	Universal, ICC, CCI, Nicco, Pawan cab, Havells, Suncab with ISI marking.
3. M.S. screw type black enameled conduit pipes manufactured as per IS 9538-part-II 1981 or latest revision	Gupta Brothers, Supreme, Sunce, Adarsh, BCG, Bharat
4. M.S. Boxes	Make out of 16 SWG sheet steel.
5. Flush type deluxe piano marked switches & ISI marked	Anchor, Leader, Maru with I.S.I marked
6. 3 Plate ceiling Roses ISI marked.	Anchor, Leader, Maru with I.S.I. marked
7. 5 A 3 pin / 2 pin socket & 15 A/5A 3 pin power plug sockets of flush type switches.	Anchor, Leader, Maru with ISI marked
8. Bell pushes marked	Anchor, Leader, Maru with I.S.I.
9. MCB, MCCBs, MCB distribution Boards	Standard/Havells/MDS/ Indo-Copp/L&T.
10. Switch Fuse Unit	L&T /English Electric/ Siemens/Hovels/HPL /standard.
11. Distribution Fuse Board Type 5N 100 TNG E.E. or equipment.	English Electric/Larsen Toubro/ Siemens/Havells/HPL
12. Energy saving model 28Watts with Electronic Choke & Ordinary 40W tube.	Unit: Trinic Tube: Philips/Wipro/Crompton.
13. Ceiling Fans	Crompton Greaves/Polar/ Orient/Bajaj with ISI marked & DGS & D approved model
14. Exhaust fans : Heavy & Light duty	Crompton Greaves/Orient Polar/Bajaj
15. Post top Lanterns, street light fixtures, Bulk head fittings, Halogen Lamps.	Philips/Crompton greaves/Bajaj / Havell's

- | | |
|------------------|--|
| 16. Transformers | ETE/HINT/VOLTAMPS/Vijay |
| | Electricals /HIT/APTransco approved makes. |
| 17. Pump sets | Kirloskar/Crompton |
| | Greaves\Texmo\Best\Calama |

SCHEDULE OF TECHNICAL PARTICULARS FOR FIRE FIGHTING

MANUAL CALL POINTS:

Make	:	Globe / Safeway
Material of body	:	M.S.
Thickness of body	:	1.5 mm
Material of frangible element	:	Safex make Safety glass (if broken it will be of diamond bits)
Contact making/breaking for alarm	:	Breaking
Overall dimensions	:	100mm x 100mm
Size of frangible element	:	70mm x 70mm

ELECTRONIC HOOTER:

Make	:	Safeway / Globe
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Material of body	:	M.S.
Thickness of body	:	16 guage

DETECTOR - IONISATION TYPE SMOKE DETECTOR:

Make	:	Devidayal / Mather & Platt / Stynetics
Type	:	Ionization Type smoke detector
Specification	:	IS 11360 - 1985
Type of radio active material and qty. (for Ionization detectors only)	:	Americal 241 less than 0.9 Micro curies.
Voltage and range	:	24 V DC 20-30 V

MAIN CONTROL PANEL:

Make	:	Globe / Safeway
Type	:	Wall mounting, cable entry from bottom
Overall dimensions	:	500 x 350 x 180mm
Thickness of body	:	16 Swg
Electrical/Electronic in operation	:	Electronic (Solid State CMOS-Circuitry)
Power Consumption	:	2 Amps Maximum
AC Voltage at input:	:	Single phase 50 Hz 230 V \pm 5%
DC Voltage for system operation	:	24 Volts
Type of Indicator Lamps	:	LED

BATTERY UNIT

Make	:	Exide / Amco / Standard.
Type	:	Lead Acid
Voltage	:	2 x 12 Volts

AH Capacity : Calculation of the AD to be given along with the design of the system.

LIST OF APPROVED MAKES / MATERIALS TO BE USED FOR CIVIL WORKS

SI No	ITEM/ MATERIAL	MAKES
1	Cement 43/53 – OPC	L&T/ Ultra Tech / Birla / KCP/ ORIENT/ Kesoram/ Ramco / any other ISI marked or ISO accredited makes.
2	Steel	Visakha Steel Plant / Tata Steel / SAIL/ or equivalent ISI marked approved make.
3	Ready Mix Concrete (RMC)	L&T/ Birla
4	Flush Door Shutters	Kutti / Anand / Raveela / Subhdwar or any equivalent ISI marked makes.
5	Aluminium Sections	Jindal / Hindalco/Indal or any equivalent ISI marked makes.
6	Aluminium Fixtures for wood and iron works	Jyothi / Classic / Oxford or any other equivalent makes.
7	Ceramic Tiles Dadoing Tiles	Johnson / Somani / Kajaria or any other equivalent makes.
8	Flooring Tiles	Johnson / Somani / Kajaria
9	Portico Tiles	Ultra/ Nitco
10	ACP Cladding	Alcopanel/ Alcomat/ Alstrong/ Durabuild
11	Structural glazing	St.Gobain/ Glaverbel
12	M S Tubes	TATA / Khandelwal / Zenith
13	GI Sheets	Jindal / TATA or any other equivalent makes.
14	Paints (a) Synthetic enamel paint, Oilbound distemper	ASIAN / NEROLAC/ ICI / BERGER or any other ISI marked makes.
	b) White primer coat external walls	JK / BIRLA/ ICI / BERGER/ ASIAN or any other ISI marked makes.
	c) Texture Paint	Spectrum
15	Water Proof Compound	FOSROC
16	Mortice Locks	Godrej / Link

I here by agree to use materials from the makes specified against each item

ARTICLES OF AGREEMENT

Articles of Agreement made this _____ day of _____ 2017 between the Superintending Engineer, APMSIDC, Circle, Guntur on behalf of Managing Director, Andhra Pradesh Health & Medical Housing & Infrastructure Development Corporation (here-in-after called the Superintending Engineer which expression shall, where the context so admits include his successors in Office and assignees) of the one part and _____ (here-in-after called the Contractor which expression shall where the context so admits include his heirs, executors, administrators and legal representatives) of the other part.

WHEREAS the APMSIDC, Hyderabad, (herein after called the Corporation) are desirous of **Improvements to Mithra campus(IIT SKLM Boys campus) at Chinaravpalli (Vil), Etcherla (Mandal), Srikakulam (Dist).**and have caused an estimate of probable quantities contained in Schedule A, drawings and specifications describing the work to be done.

AND whereas the said Schedule A, drawings numbered serially from _____ (Schedule B) and the specifications (Schedule C) have been signed by the parties hereto.

And whereas the contractor has agreed to the Retention by the Corporation the Earnest Money of Rs. _____ paid by him as security for the due fulfillment of the contract to the satisfaction of the Executive Engineer, APMSIDC, (herein after called the Executive Engineer).

AND whereas the contractor has also signed the copy of the AP Standard Specifications and addenda Volume thereto maintained by the authority who registered him/them in the appropriate class in acknowledgement of being bound by all conditions of the clauses of the Standard Preliminary Specifications for Items of work described by a Standard Specification Number in Schedule-A in addition to having signed the "Tenderers" and Contractor certificate in acknowledgement of being bound by all the conditions of the Standard Preliminary Specifications and all the Standard Specifications for item of work, described by the Standard Specification Number in Schedule A.

AND whereas the contractor has agreed to execute upon and subject to the conditions set forth in the preliminary specification of the Andhra Pradesh Detailed Standard Specifications and such other conditions as are contained in all the specifications forming part of this contract (herein after referred to as the said conditions) the works shown upon the drawings and described in the said specifications and set forth in Schedule A as the "Probable quantities" and comply with the rate of progress noted at the end of this Articles of Agreement for a sum of _____ or such other sum as may be arrived at under the Clauses of the Standard Preliminary Specifications relating to payment on lump sum basis or by final measurement at unit prices.

NOW IT IS HEREBY AGREED AS FOLLOWS

In consideration of the payment of the said sum of _____ or such other sum as may be arrived at under the clauses of the Standard Preliminary Specifications relating to payment on lump sum basis or by final measurement at unit price, the contractor will upon and subject to the said conditions execute and complete the works shown upon the said drawings and described in the said specifications and to the extent of probable quantities shown in the Schedule 'A' with such variations by way of alterations additions to, or deductions from, the said works and method of payment there for as are provided for the said conditions.

The term Executive Engineer in the said conditions shall mean the officer of the Corporation in charge of the Division having jurisdiction for the time being over the work, who shall be competent to exercise all the powers and privileges reserved herein in favour of the Corporation with the previous sanction of or subject to ratification by the Superintending Engineer of the Corporation in cases where such sanctions or ratification may be necessary.

The plans, agreement and documents above mentioned shall form the basis of this contract and the decision of the said Executive Engineer as to the materials, workmanship and to the intended interpretation of clauses of the Agreement or any other document attached here to shall be final and binding on both parties.

The said contract comprises of the building work above mentioned and all subsidiary works connected there with within the same site as may be ordered to be done from time to time by the said Executive Engineer, even though such works may not be shown on the drawing or described in the said specifications of the priced schedule of quantities.

The Superintending Engineer through the Executive Engineer reserves to himself the right of altering the drawings and nature of the work and adding or omitting from any items of work or of having portions of the same carried out departmentally or otherwise and such alterations or variations shall be carried out without prejudice to this contract.

If at any time after the commencement of the work, the Superintending Engineer for any reason whatsoever does not require the while thereof as specified in the tender to be carried out the Executive Engineer / Superintending Engineer shall give notice in writing of the fact of the Contractor who shall have no claim to any payment of compensation whatsoever on account of any profit or advantage which he might have derived from the execution of the work in full but which he did not derive in consequences of the full amount of the work not having been carried out, neither shall he have any claim for compensation by reason of any alterations having been made in the original specifications, drawings designs and instructions which shall involve any curtailment of the work as originally contemplated.

Time shall be considered as essence of the Agreement and the contractor hereby agrees to commence the work as soon as his Agreement is accepted by the Superintending Engineer and the site (or premises) is handed over to him as provided for in the said conditions and agrees to complete the work within the period of 1 Months from the date of such handing over of the site (or premises) and to show progress as defined in the tabular statement Rate of progress, subject nevertheless to the provisions for extension of time contained in Clause 59 of the Standard Preliminary Specifications.

The Arbitrator for fulfilling the duties set forth in the arbitration clauses of the standard preliminary specifications shall be as defined with tender conditions vide item No.22 of conditions of contract (A. General) enclosed to the contract.

The said conditions shall be read and construed as forming part of the agreement and the parties here to respectively abide by and submit themselves to the conditions and stipulations and perform the agreement in their parties respectively.

Upon the terms and conditions of this agreement being fulfilled and performed to the satisfaction of the corporation, the balance amount including any deposit of the contractor shall be returned after the expiry of liability period i.e. 24 months + defects correction period after virtual completion of work as per drawings and tender conditions.

Payment will be made to the contractor under the certificate to be issued at reasonably frequent intervals by the Executive Engineer. Intermediate payments will be made by the Executive Engineer of a sum equal to 92 ½ percent of the value of work as so certified and the balance of 7 ½ percent will be with held and retained as a security for the due fulfillment of the contract. Under the certificate to be issued by the Executive Engineer on the completion of the entire work, the contractor will receive final payment of all the money due or payable to him under or by virtue of the contract except EMD retained as security and a sum equal to 2 ½ percent of the total value of the work done provided there is no recovery from or forfeiture to be made under clause 60 of the PS to APSS. The amount with held from the final bill will be retained under "Deposits" and paid to the contractor together with the EMD retained as security after a period of 24 months after all defects shall have been made good according to the true intent and meaning thereof.

Under provisions of sections 194 (c) add in the Income Tax Act under the Finance Bill two point two percent out of each and every payment made to the contractor will be deducted towards Income Tax at source to be credited to the Income Tax Department and necessary certificates will be issued to the contractor.

All disputes arising out or in any way connected with this agreement shall be deemed to have arisen in Hyderabad and only the court in Hyderabad city shall have jurisdiction to determine the same.

In witness whereof the _____has here into set his hands and Superintending Engineer, APMSIDC on behalf of and by the order and direction of the Corporation has here up to set his hand the day and year first above written.

Signature of the Contractor _____

Address:

PRICE BID

NAME OF WORK: **Improvements to Mithra campus(IIIT SKLM Boys campus) at Chinaravpalli (Vil), Etcherla (Mandal), Srikakulam (Dist).**

Estimated contract value (in figures & words): Rs. 2445590/-

[RUPEES TWENTY FOUR LAKHS FOURTY FIVE THOUSAND FIVE HUNDRED AND NINTETY ONLY]

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

- a) at an overall tender percentage of ____% (in figures) ____percentage (in words) on estimated value.

SIGNATURE, NAME OF THE TENDERER / AUTHORISED SIGNATORY.

DECLARATION

I/We have gone through carefully all the bid 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 Department against me/us if it is found that the statements, documents, certificates produced by me/us are false/fabricated.

I/We hereby declare that, I/We have not been blacklisted/debarred/suspended/demoted in any department in Andhra Pradesh or in any State due to any reasons.

Signature of the bidder

STATEMENT – I

Details of value of Civil Engineering works executed in each year during the last five financial years by the bidder:

Sl. No	Financial Year	Value in Rs.
1.	2012-2013	
2.	2013-2014	
3.	2014-2015	
4.	2015-2016	
5.	2016-2017	

- a) Attach certificate(s) issued by the Executive Engineer/Equivalent officer concerned and counter signed by Superintending Engineer / Equivalent officer showing work wise/year wise value of work done in respect of all the works executed by the bidder during last five years.

Signature of the bidder

STATEMENT – II

Details of similar works completed in the name of the bidder during the last five financial years:

Sl. No	Name of the work	Address of Agt. concluding authority	Agreement No. & date	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) Attach certificate(s) issued by the Executive Engineer/Equivalent officer concerned and counter signed by Superintending Engineer / Equivalent officer showing work wise/year wise value of work done in respect of all the works executed by the bidder during last five years.

Signature of the bidder

STATEMENT - III

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

Sl No	Financial Year	Name of the work	Agt.No	Quantities executed / Year wise.		
				EWE	PCC/ RCC/ VRCC	Stone masonry / Brick masonry
1	2	3	4	5	6	7
1	2012-2013					
2	2013-2014					
3	2014-2015					
4	2015-2016					
5	2016-2017					

- a) Attach certificate(s) issued by the Executive Engineer/Equivalent officer concerned and counter signed by Superintending Engineer /Equivalent officer duly showing the quantities executed year wise during last five years.

Signature of the bidder

STATEMENT - IV

Details of existing commitments

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

A) Existing commitments on ongoing works:

Sl. 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

- a) Attach certificates issued by the Executive Engineer/equivalent officer concerned and countersigned by Superintending Engineer /equivalent officer indicating the balance work to be done and likely period of completion.

Signature of the bidder

STATEMENT - IV

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

Sl. No	Name of work	Address of Agt. concluding authority	Estimated value of work	Stipulated period of completion	Date on which bid was submitted	Present stage of bid
1	2	3	4	5	6	7

Signature of the bidder

STATEMENT - V

Availability of critical equipment:

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

Sl.No	Details of equipment	Number required	Number		
			Owned	Leased	To be procured
1	2	3	4	5	6
1	Steel centring				
2	Pin vibrators				
3	Pan vibrators				
4	Weigh batchers				
5	Concrete mixers				

6	QC Lab				
7	Static Weight Roller				

Signature of the bidder

A declaration regarding the equipment owned shall be produced by the bidder on a non-judicial stamp paper of Rs. 100/- as below:

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 department detects at any stage that I/we do not possess the equipment listed below.

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

Signature of the bidder

STATEMENT - VI

Availability of key personnel:

Qualification and experience of key personnel proposed to be deployed for execution of the contract:

Sl. No	Name	Designation	Qualification	Total experience	Working with the bidder since
1	2	3	4	5	6

Signature of the bidder

STATEMENT - VII

Information on litigation history in which bidder is the petitioner:

Sl. No	Case No/Year	Court where filed	Subject matter/prayer in the case	Respondents i.e., SE/CE	Present stage
1	2	3	4	5	6

STATEMENT - VIII
(IN CASE OF WORKS COSTING MORE THAN RS.2.00 CRORES)
DECLARATION

"I/We do hereby solemnly affirm and declare that I /we own /tie up the following equipment for using on the subject work at each and every work site 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 department detects at any stage that I/we do not possess the equipment listed below at each and every work site.

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

17	Non-destructive strength equipment	concrete	1 No		
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