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TENDER FORM

PROJECT: PROPOSED DEVELOPMENT WORKS OF RESIDENTIAL TOWNSHIP FOR SOFTWARE ENGINEERS EMPLOYEES HOUSING & WELFARE ASSOCIATION AT KOTHUR VILLAGE, KANDUKUR MANDAL, R.R. DISTRICT

REF : EXTERNAL WATER SUPPLY & SEWERAGE SYSTEM.

Dear sirs,

I/We the undersigned have carefully gone through and clearly understood after visiting the site and the Tender drawings and tender documents comprising of the tender form, Notice to contractors, and conditions for building contract, Special Conditions, Specifications and Schedule of Probable quantities and Draft Agreement prepared by your Plumbing consultant .

I/We do hereby undertake to execute and complete the whole or part of the work (as desired by you) at the respective rates which I/We have quoted for the respective items of the Probable Bill of Quantities and at which rate the items specified amount to Rs.

I/We are depositing as Earnest Money a sum of Rs _____ by demand draft in favour of _____ along with this tender for due execution of the work at my/our tendered rates together with any variations which shall be adjusted by the s at prices based on our tendered rates. I/We shall deposit further sum equivalent to 2% of tender amount, less EMD paid in the event of my/our tender being accepted, towards initial security deposit.

In the event of this Tender being accepted I/We agree to enter into an agreement as and when required and execute the contract according to your form of Agreement, within a month of receipt of work order, in default thereof, I/We do hereby bind my-self/ourselves to forfeit the aforesaid initial security deposit.

I/We further agree to complete the work covered in the said schedule of quantities within 6 months from the 15th day reckoned from the date of issue of the work order to commence the work or on which contractor is instructed to take possession of the site, whichever is later.

I/We agree not to employ Sub-contractors other than those that may be specifically approved by your Architects/consultant for this contract work.

I/We agree to pay the Government, General Sales Tax (State And Central), service tax, Excise and Octroi duties, Insurance, Seigniorage charges and all other taxes including works contract tax

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etc., as the prevailing from time to time, on such items for which the same are leviable, and to get the work, workers, employers (of contractor, & Employer) engaged on the work at site and all materials and machinery collected and kept/operated at site for execution of the work shall be insured comprehensive insurance including fire/accidents/ rain/ floods/riots/CAR policy (contractor's all risk insurance policy) and the insurance shall cover the period from date of start of work to date of actual completion of work plus 3 months. In case part work is taken over by the Employer before final completion of the whole work, such parts may not be covered by the insurance from the date of taking over that part of work by the Employer. Draft Insurance deed will be got vetted by the Architect, before obtaining the same. All the rates quoted by me/ us are inclusive of the same in full and nothing extra shall be claimed anytime on account of any of these.

I/We agree to pay Income tax, to be deducted at source, at the rate of 2% on the Gross value of the work done, and the rates quoted by me/we are inclusive of same.

I/We agree to pay works contract tax, to be deducted at source, at the rates prevailing from time to time as per APGST Act, as amended and rates quoted by me/us are inclusive of the same.

Yours faithfully,

Contractor's Signature

Address:

Date:

NOTICE TO CONTRACTOR

ADDRESS:

**PROJECT: PROPOSED DEVELOPMENT WORKS OF RESIDENTIAL
TOWNSHIP FOR SOFTWARE ENGINEERS EMPLOYEES
HOUSING & WELFARE ASSOCIATION AT KOTHUR
VILLAGE, KANDUKUR MANDAL, R.R. DISTRICT**

REF : EXTERNAL WATER SUPPLY & SEWERAGE SYSTEM

Dear sirs,

1. On behalf of our clients, _____, we have pleasure in inviting you to tender for the aforesaid work.
2. The scope of work broadly for Development works such as laying of External water supply & Sewerage system.
3. Tender Documents can be obtained from our office on payment of Rs. _____ by cash/Demand Draft in favour of _____ Hyderabad during office hours on any working day from _____ to _____

Sealed tenders in the prescribed form, in a sealed envelope should be addressed to

_____, Hyderabad, and superscribed tender for the Development works of External water supply & Sewerage system.

- a. **Envelope No.1:** To contain contractor's Technical assumptions and Terms and Conditions, if any, along with Demand Draft/Banker's cheque for Rs. _____ as EMD.
- b. **Envelope No.2 :** Price bid to contain 's tender documents along with B.O.Q, completed in all respects & duly signed along with drawings.

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And submitted to the above address not later than 15.00 hours on _____
Envelope No.1 and 2 will be opened on the same day at 15.30 hours in the presence of the contractors, who may be present.

5. The tenderer must obtain for himself, on his own responsibility and at his own expenses, all the information which may be necessary for the purpose of filling this tender and for entering into a contract for the execution of the same and must examine the drawings and inspect the site of the work and acquaint himself with all local conditions and matters pertaining thereto.
6. Each of the tender documents page is required to be signed by the person or persons submitting the tender in token of his/their having acquainted himself/themselves with the General conditions etc., as laid down. Any tender with any of the documents not so signed will be rejected.
7. The tender documents must be filled in English and all the entries must be made by hand and written in ink. If any of the documents are missing or un-signed, the tender shall be considered invalid.
8. Each and every one of all erasures and additions/alterations made, while filling the tender, must be attested by initials of the tenderer. Over-writing of figures must be attested by initials of the tenderer. Overwriting of figures is not permitted. Failure to comply with either of these conditions will render the tender void. After submission of the tender no advice or any change in rate or conditions will be entertained. All the rates should be quoted both in figures and words. In-case of any discrepancy in rates quoted in words/figures and the amounts, the rate quoted in words shall be taken as final and binding.
9. The tender shall be valid for a period of 90 days from the date of opening the Envelope No.1
10. TOTAL SECURITY DEPOSIT : shall comprise of:
 - a. Earnest Money deposit
 - b. Initial Security deposit
 - c. Retention money
- 10.1 The intending tenderer shall deposit with _____ Hyderabad by Demand Draft a sum of Rs _____ as the Earnest Money, as a guarantee of good faith, which amount shall be forfeited as liquidated damages, in the event of any evasive/direct refusal or delay in starting the work and or signing the contract. The deposit of the unsuccessful tenderers will be returned, without interest, immediately after a decision is taken regarding the award of the contract. The Earnest money of the successful tenderer will be adjusted towards Security Deposit. A tender not accompanied by Earnest money deposit will not be

- considered. No concession will be made to Public sector companies from payment of earnest money deposit.
- 10.2 The successful tenderer will have to pay further sum equivalent to 2% of his contract value, less EMD already paid, as initial Security Deposit (ISD) by means of a D.D./Banker's cheque in favour of _____, Hyderabad with in 14 days from the date of issue of work order to commence work. The EMD and Security deposit thus paid shall be held by the _____, Hyderabad, as Security deposit, for due execution and fulfillment of the contract, till the completion of the work and defect liability period in all respects and shall not bear any interest.
- 10.3 Together with the money paid under clause 10.1 & 10.2 above, further retention of 8% of the value of the work done will be deducted from every running bill, till total retention, including EMD and initial SD paid earlier, comes to 5% of the contract value, and same shall be held by the M/s _____ as Total Security Deposit. On the _____ certifying the completion of work, 50% of the total security deposit shall be released to the contractor alongwith the final certificate of payment, and the balance amount will be retained in the manner stated elsewhere for a further period of twelve months after the completion date recorded in completion certificate, issued by the _____ and agreed to by the M/s _____. Also refer condition 22(ii) on Page 7 of Volume 1.
11. Within one month of the receipt of intimation from the _____ of the acceptance of his/their tender, the successful tenderer shall be bound to sign an agreement, on a stamp paper in accordance with the Draft Agreement and conditions of contract attached herewith, but the work order or the written acceptance of a tender by the Employer will constitute a binding agreement between the Employer and the person tendering whether such formal contract is or not signed by the contractor.
12. All compensation or other sums of money payable by the contractors to the clients, under the terms of this contract, may be deducted from the Security Deposit or from any sum that may be or may become due to the contractor on any account whatsoever, and in the event of the Security deposit being reduced by reasons of any such deductions, the contractor shall within 15 days of being asked to do so make good in cash or cheque, any sum which have been deducted from his security deposit.
13. The contractor shall arrange for the procurement of all the materials at site as required and directed, and store them in their godown at the site of construction, and also bear all the expense incurred in connection therewith, including payment of taxes, octroi, storage, watch and ward etc.

14. The rates quoted by the Contractor shall include all eventualities, such as heavy rain, sudden floods, accidents, fire, riots etc., which may cause damage to the executed work or which may totally wash out the work. Until the completion certificate is issued to the Contractors, neither the Architect/consultant nor the clients will not be responsible for such damage or wash out of the construction work.
15. Time is the essence of the contract. The Employer proposes to use the factory building for production works. The work should be completed within 6 months, from the date of commencement. The date of commencement shall be

a) The day two weeks from the date of issue of work order.

Or

b) The day on which the contractor receives the possession of the site which ever is later.

Or

c) The contractor is asked in writing to take over the possession of the site.

The successful contractor will have to give a CPM/PERT chart of various activities of work to be done so that the work gets completed within the stipulated time. The chart shall be submitted within 15 days from the date of acceptance of the tender.

16. If the contractor fails to complete the work by the Scheduled date of completion or within any sanctioned extended time, he will have to pay liquidated damages at the rate of ½% of contract amount for each week of delay the work remains incomplete beyond the completion(Original/extended date), subject to maximum of 5% of the contract value (without extra items) as per clause 31 of the General conditions of contract.
17. The quantities contained in the Schedule are only indicative. The work as actually carried out and done will be measured up from time to time, for which payment will be made subject to the terms and conditions of contract.
18. The unit prices shall be deemed to be fixed prices. In case of extra items, a record of labour charges paid shall be maintained and shall be presented every month for extra/substituted items regularly to the Architects for checking. The settlement will be made based on figures arrived at jointly and taking into account unit prices of items of work mentioned in the contract assigned to the successful tenderers. In case, of extra items, where similar or comparable items are quoted in the tender, extra rates shall invariably be based on those tender rates to the extent reasonable.

19. Our clients, M/s SOFTWARE ENGINEERS EMPLOYEES HOUSING & WELFARE ASSOCIATION, Hyderabad do not bind themselves to accept the lowest or any tender and reserve to themselves the right to accept or reject any or all tenders, either in whole or in part, without assigning any reason whatsoever for doing so.
20. No employee of the client is allowed to work as a contractor for a period of two years of his retirement from client service, without the previous permission of the client. This contract is liable to be cancelled, if either the contractor or any of his employees is found at any time to be such a person who had not obtained the permission of the client as aforesaid before submission of the tender or engagement in the contractor's service.
21. The tenderer, apart from being a competent contractor must associate himself with agencies of the appropriate class who are eligible to tender for (1) Sanitary & Water Supply installations and as the case maybe.
22. Release of security deposit:
 - i) 50% of the total security deposit will be released along with the final certificate of payments as stipulated under para 10 on page 10 , Appendix to General Conditions of contract,
 - ii) Balance 50% of Retention money will also be released as noted under(i) above, subject to submission of a Bank Guarantee, to the satisfaction of M/s SOFTWARE ENGINEERS EMPLOYEES HOUSING & WELFARE ASSOCIATION, Hyderabad . for an equivalent amount. This Bank Guarantee shall be valid upto completion of defects/removal liability period plus 3 months.
23. While submitting the tender, the contractor should separately furnish particulars of disputes with the previous clients for the last three years which have been referred to arbitration or are pending in a court of law.

ARTICLES OF AGREEMENT

ARTICLES OF AGREEMENT made the _____ day of _____ 2007
between _____

_____ of _____

(hereinafter called the "Employer") of the one part and _____
of _____ (hereinafter called "The
Contractor") of the other part, where as the Employer is desirous of getting the work of
"_____"

executed and has caused drawings, conditions of contract, specifications and schedule of
quantities etc., describing the works prepared by .

AND WHEREAS the SAID DRAWINGS numbered as per list attached inclusive of and
the conditions of contract, specifications and schedule of quantities etc., have been signed
by or on behalf of the parties hereto.

AND WHEREAS THE CONTRACTOR has agreed to execute upon and subject to the
conditions set forth in the Schedule hereto (hereinafter referred to as "Said Conditions")
the works shown upon the said drawings and described in the same specifications and
included in the said schedule of quantities for such sum as may be ascertained to be
payable in terms of the Bills of Quantities, and which sum is estimated to be Rs.
_____ (Rupees _____)
(hereinafter referred to as "Said Contract Amount").

NOW IT IS HEREBY AGREED AS FOLLOWS:

1. In consideration of the said sum to be paid at the times and in the manner set forth
in the said conditions, the contractor shall upon and subject to the said conditions,
execute and complete the work shown in the said drawings and described in the
said specifications.
2. The Employer shall pay the contractor the said sum or such sums as shall become
payable hereunder at the times and in the manner specified in the said conditions.
3. The term " " in the said conditions shall mean the said , or in the event of their
ceasing to be the for the purpose of this contract, such other person as shall be
nominated for that purpose by the Employer , not being a person to whom the
contractor shall object for reasons considered to be sufficient by the Arbitrator
mentioned in the said conditions provided always that no persons subsequently
appointed to be the under this contract shall be entitled to disregard or over-rule
any previous decision or approval or direction given or expressed by the
Architect/Consultant for the time being.

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4. Tender documents containing Notice to the Contractor, Conditions of Contract, Appendix thereto, Special Conditions of Contract, Specifications and Schedule of Quantities with the rates entered therein, shall be read and studied as forming part of this agreement and the parties hereto shall respectively abide by and submit themselves to the conditions and stipulations and perform the agreement on their part respectively in such conditions contained.
5. The contract is neither a fixed lumpsum contract or a piece work contract, but is a contract to carry out work in respect of the entire works to be paid for according to actual measured quantities, including variations from BOQ at the rates contained in the Schedule of rates and Probable bill of quantities or as provided in the said conditions.
6. The Employer through the , reserves to himself the right of altering the drawings and natures of the work, of adding/substitution to or omitting any items of work or having portions of the same carried out through alternate agencies without prejudice to this contract.
7. Time shall be considered as the essence of this agreement and the contractor hereby agrees to commence the work soon after the site is handed over to him but within 15 days reckoned from the date of issue of work order to execute the work, as provided for in the said conditions and complete the entire work in 6 months subject to nevertheless to the provisions for extension of time.
8. This agreement and contract shall be deemed to have been made in Hyderabad and any questions or dispute rising out of or in any way connected with this Agreement and Contract shall be deemed to have arisen in Hyderabad and only the courts in Hyderabad shall have jurisdiction to determine the same.

AS WITNESS our hand this _____ day of _____ 2007.

Signed by the said in the presence of :

WITNESS : SIGNATURE

NAME :

ADDRESS :

EMPLOYER

WITNESS : SIGNATURE

NAME :

ADDRESS :

EMPLOYER

CONTRACTOR

APPENDIX TO GENERAL CONDITIONS OF CONTRACT

- | | | | |
|-----|---|---|--|
| 1. | Estimated cost | : | Rs. |
| 2. | Earnest Money Deposit (EMD) | : | Rs |
| 3. | Initial Security Deposit (ISD) | : | 2% of contract value including EMD. |
| 4. | Period of completion | : | 6 months |
| 5. | Defects Liability period | : | 12 months after completion as recorded in the completion certificate. |
| 6. | Agreed Liquidated Damages | : | ½% of contract amount per week of delay subjected to a maximum of 5% of contract value. |
| 7. | Period of final measurement | : | One month after completion as recorded in the completion certificate. |
| 8. | Minimum value of work to be Executed for issue of interim Certificates for making payment | : | Minimum of Rs. |
| 9. | Retention money from each bill | : | 8% of gross value of each interim bill, subject to 9(b) below. |
| b. | Total retention money including Earnest money and initial security Deposit | : | 5% of the contract value. |
| 10. | Release of Security deposit after Virtual completion. | : | 50% of the total security to be released along with final certificate of payment, but only after removing all his materials, equipment, labour, huts/force, temporary sheds/stores, all his installations, machinery etc., from the site. Balance payment to be released on submission of Bank Guarantee on any Scheduled Bank, in the prescribed manner and valid |

till the completion of defects liability
period of 12 months.

10. Period for honouring certificate : 15 working days from date of
certificate of payment for interim
bills and 30 working days for final
certificate.

WITNESS :

DATE : SIGNATURE OF THE CONTRACTOR WITH DATE

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GENERAL CONDITIONS OF CONTRACT

1. INTERPRETATIONS:

In constructing these conditions and the specifications, schedule of quantities and contract agreement, the following words shall have the meaning herein assigned to them except where the subject or context otherwise required:

- a. “Employer” shall mean _____, Hyderabad and shall include his/their heirs, legal representatives, assignees and successors.
- b. “Contractor” shall mean _____ and shall include his/their heirs, legal representatives, assignees and successors.
- c. “Client’s Engineer” shall mean any Engineer who is employed by M/s Association of Lady Entrepreneurs of Andhra Pradesh, Hyderabad , or any other Engineer appointed from time to time by the Employer, and certified in writing to the Architect and the contractor, to act as Engineer for the purpose of the Contract in place of the said engineer.
- d. “Employer’s Representative” shall mean Project Management s employed by the client/any assistant of the Engineer or any site engineer/ PMC appointed from time to time by the employer to perform the duties set forth in clause 15 hereof whose authority shall be notified in writing to the Architect and Contractor by the EMPLOYER.
- e. Consultant shall mean any Engineer/ representative appointed by _____, Hyderabad.
- f. “Works” shall mean the works to be executed in accordance with contract specifications, quantities etc.
- g. “Contract” shall mean the Articles of Agreement, the General Conditions, Special Conditions, the Appendix, the Schedule of Quantities, Specifications and drawings etc., attached hereto and duly signed.
- h. “Contract Price” shall mean the sum named in the Tender, subject to such amount additions thereto or deductions there from as may be made under the provisions, hereinafter contained.

- i. “Site” shall mean the lands and other places as shown on the site plan, on which the works are to be, provided, by the Employer or Architect for the purpose of the Contract.
- j. “Drawings” shall mean the drawings referred to in the contract etc., and any modifications of such drawings approved in writing by the Architect and the Employer and such other drawings as may from time to time be furnished or approved in writing by the Consultant and Employer.
- k. “Notice in Writing” or written notice shall mean a notice in writing, typed or printed characters sent (unless delivered personally or otherwise provided to have been received) by registered post to the last known private or business address or registered office of the address and shall be deemed to have been received, when in the ordinary course of post, it would have been delivered.
- l. “Act of Insolvency” shall mean any Act of Insolvency as defined by the Presidency Towns Insolvency Act, or the Provincial Insolvency Act or any act amending such original.
- m. “Net Prices” if in arriving at the Contract Amount, the contractor has added to or deducted from the total of the items of the Tender any sum, either as a percentage or otherwise, then the net price of any items, in the tender, shall be the sum arrived at by adding to or deducting from the actual figure appearing in the Tender, as the price of that item, a similar percentage or proportionate sum. Provided always that in determining the percentage or proportion of the sum so added or deducted by the contractor, the total amount of any Prime cost items and provisional sums of money shall be deducted from the total amount of the Tender. The expression “net rates” or “net prices” when used with reference to the contract or account shall be held to mean rates or prices so arrived at.
- n. “Virtual Completion” shall mean that the building is in the opinion of the Architect and Employer, sufficiently completed for occupation by the Employer, in relation to the scope of work of this contract.
- o. Words importing persons include firms and corporations. Words importing the singular only, also include the plural and vice versa, where the context requires.

2. **SCOPE OF CONTRACT:**

The contractor shall carry out and complete the said work in every respect in accordance with this contract with the directions of and to the satisfaction of the Consultant and Employer. Consultant, with the approval of the Employer, may

issue further drawings and/or written instructions, details, directions and explanations, which are hereafter collectively referred to as “Consultant’s Instructions” in regard to:

- a. The variations or modifications of the designs, quality or quantity of works or the addition or omission or substitution of any work.
- b. Any discrepancy in the drawings or between the Schedule of Quantities/ or drawings and/or specifications etc.
- c. The removal and/or re-execution or any works executed by the contractor.
- d. The removal from the site of any material brought there on by the contractor, and the substitution of any other material there from.
- e. The dismissal from the works of any person employed thereupon.
- f. The opening up for inspection of any work covered up.
- g. The amending and making good of any defects under clause 23 “Removal of Improper works and Materials”.

The contractor shall forthwith comply and fully execute any work comprised in such Consultant’s instruction, provided always that instructions, directions and explanations given to the contractor or his representative upon the works by the Consultant shall, if involving a variation, be confirmed in writing by the contractor or within 7 days, and if not dissented from in writing within further 7 days by the consultant, such shall be deemed to be the consultants instructions with in the scope of contract.

If compliance with the Consultant’s instructions as aforesaid involved work and/or expense and/or loss beyond that contemplated by the contract, then unless the same were issued owing to some breach of this contract by the contractors, the employer shall pay to the Contractor on the certificate, the price of the said work (as an extra to be valued as herein after provided) and/or expense and/or loss.

3. **DRAWINGS AND SPECIFICATIONS:**

The works shall be carried out to the entire satisfaction of the EMPLOYER and the consultant, in accordance with the signed contract document, drawings and specifications and such further drawings and details as may be provided by the Architect, and in accordance with such written instructions, directions and explanations, as may from time to time be given by the Architect and the Employer, whose decision as to the sufficiency and quality of the work and materials shall be

final and binding on the contractor. If the work shown on any such further drawings or work that may be necessary to comply with any such instructions, directions or explanations, be in the opinion of the contractor outside the scope of work or reasonably could not be inferred from the contract, he shall before proceeding with such work, give notice in writing to this effect to the Architect and the Employer, and in the event of the Architects and the Employer agreeing to the same in writing, the contractor shall be entitled to an allowance in respect of such extra work as an authorized extra. If the Architect and the contractor fail to agree, as to whether or not there is an extra, then, if the Architect decided that the contractor is to carry out the said work, the contractor shall do so, and the question whether or not there is any extra and if so, the amount thereof, shall failing agreement be settled by Arbitration as hereinafter provided, but such reference shall in no way delay the fulfillment of this contract.

No drawing shall be taken as in itself an order for variation, unless in addition to the Architect's signature, it bears express words stating that it is intended to be such an order or bears a remark "VALID FOR CONSTRUCTION". No claim for payment for extra work shall be allowed, unless the said work shall have been executed under the provisions of clause 8 (Authorities, notices, patents, rights and royalties) or by the authorities, of directions in drawing of the Architect as herein mentioned.

One complete set of the signed drawings and a copy of contract document (specifications and schedule of quantities etc) shall be furnished by the Architect to the contractor. The Architect shall furnish within such time as he may consider reasonable, one copy of any additional drawings, which in his opinion may be necessary for the execution of any part of the work. Such copies shall be kept at the works, and the Architect or his representatives shall, at all reasonable times have access to the same and shall be returned to the Architect by the Contractor, before the issue of the final certificate. The original contract documents shall remain in the custody of employer.

Please refer clause 36 of Special conditions of contract.

4. **SCHEDULE OF QUANTITIES:**

The Schedule of Quantities unless otherwise stated shall be deemed to have been prepared in accordance with the Standard Procedure of the Architects and shall be considered to be approximate and no liability shall attach to the Architect for any error/variations that may be discovered therein.

Please refer Clause 5, 6 and 40 of Special conditions of contract.

5. **SUFFICIENCY OF SCHEDULE OF QUANTITIES:**

The contract shall be deemed to have satisfied himself before tendering as to the correctness and sufficiency of his tender for the works and of the prices stated in the schedule of Quantities and/or the Schedule of Rates and Prices, which rates and prices shall cover all things necessary for the proper completion of the works.

Please refer clauses 5, 6 and 40 of Special Conditions of Contract.

6. **ERRORS IN SCHEDULE OF QUANTITIES:**

Should any error appear in the Schedule of Quantities, other than in the Contractor's prices and calculations, it shall be rectified and such rectification shall not vitiate the contract but shall constitute a variation of the contract and be dealt with as an authorised extra or deduction.

7. **CONTRACTOR TO PROVIDE EVERYTHING NECESSARY:**

The contractor shall provide everything necessary for the proper execution of works according to the true intent and meaning of the drawings, specifications and the Schedule of Quantities etc., taken together, whether the same may or may not be particularly shown or described there in, provided the same can be inferred there from. The several documents forming the contract are to be taken as mutually explanatory to one another; detailed drawings and figured dimensions in preference to scale, and special conditions in preference to General conditions and particular specifications in preference to General specifications.

In case of discrepancy between the Schedule of Quantities, the specifications and/or the drawings, the following order of preference shall be observed:-

- i) Description of Schedule of Quantities.
- ii) Particular specifications and special condition, of any.
- iii) Drawings.
- iv) C.P.W.D. specifications.
- v) Indian Standard specifications of B.I.S.

If there are varying or conflicting provisions made in any document forming part of the contract, the Architect shall be the deciding authority, with regard to the intention of the document and his decision shall be final and binding on the contractor.

Any error in description, quantity or rate in schedule of quantities or any omission there from shall not vitiate the contract or release the contractor from the execution of the whole or any part of the works expressed therein according to drawings and specifications or from any of his obligations under the contract.

The contractor shall make his own arrangements for providing water, for carrying out the work, at his own cost. If water from any source other than Municipal main is to be used for construction, the same shall be tested at the contractor's cost, and a report submitted to the Architect for his approval, before such water is used for the works. Temporary Electrical connections shall be obtained by the contractor to facilitate execution and completion of work at their cost and all the charges there of should be borne by them.

The contractor shall supply, fix and maintain at his cost, during the execution of any works, all the necessary centering, scaffolding, staging, planking, timbering, strutting, shoring, pumping, fencing, hoarding, watching and lighting during nights as well as by day required not only for the proper execution and protection of the said works, but also for the protection of the public and the safety of any adjacent road, streets, cellars, vaults, pavements, walls, houses, buildings and all other erections, matters or things. The Contractor shall take down and remove any or all such centering, scaffolding, staging, planking, strutting, shoring etc., as occasion shall require or when ordered or so to do, and shall fully reinstate at his own cost and make good all the matters and things disturbed during the execution of the works to the satisfaction of the Architects.

Please refer clause 7 of Special conditions of contract.

8. **AUTHORITIES, NOTICES, PATENT RIGHTS AND ROYALTIES:**

The contractor shall conform to the provisions of the statutes relating to the works, and to the regulation and by laws of any local authority, and of any water, lighting and other companies or authorities, with whose systems the structures are proposed to be connected; and shall before making any variation from the drawings or specifications, that may be necessitated by so conforming, give to the Architects a written notice, specifying the variations proposed to be made and the reason for making it and apply for instruction thereon. In case, the contractor shall not within ten days receive such instructions, he shall proceed with the work conforming with the provisions, regulations or by laws in question.

The contractor shall bring to the attention of the Architect all notices required by the said acts, regulations or bylaws to be given to any authority, and pay to such authority or to any Public Officer all fees that may be properly chargeable in respect of the works, and lodge the receipts with the Architects.

The contractor shall indemnify the Employer against all claims in respect of patent rights, designs, trade marks or name or other protected rights in respect of any constructional plant, machine, work or material used for or in connection with works or temporary works and from and against all claims, demands, proceedings, damages, costs, charges, and expenses whatsoever in respect thereof or in relation thereto. The Contractor shall defend all actions arising from such claims, unless he has informed the Architects, before any such infringement and

received their permission to proceed, and shall himself pay all royalties, licence fees, damages, cost and changes of all and every sort that may be legally incurred in respect thereof.

Please refer clause 23 of special conditions of contract.

9. **MATERIALS AND WORKMANSHIP TO CONFORM DESCRIPTION:**

All materials and workmanship shall, so far as procurable be of the respective kinds specified in the Schedule of Quantities and/or specifications and in accordance with the Architect's furnish to them all invoices, accounts, receipts and the other vouchers to prove that the materials comply therewith. The contractor shall at his own cost arrange for and/or carry any test of any materials, cost arrange for and/or carry any test of any materials, which the Architect & Employer may require. The costs of materials used for testing, packing, transportation and testing shall be borne by the contractor and his quoted rates/amounts shall include all such expenses/contingencies.

- 9a. In case of non-availability of specified Make/brand of any material including steel and cement the alternate make/brand will be given by the Employer in consultation with the Architect.

10. **THE SETTING OUT:**

The Contractor shall at his own expense, set out the works accurately in accordance with the plans and to the complete satisfaction of the Architect. The Contractor shall be solely responsible for the true and perfect setting out of the same and for the correctness of the positions, levels, dimensions and alignment of all parts thereof. If at any time any error shall appear during the progress or on completion of any part of the work, the contractor shall at his cost rectify such error if called upon to the satisfaction of the Architects/Employer. The work shall from time to time be inspected by the Architect and/or his representatives, but such inspections shall not exonerate the contractor in any way from his obligation to remedy any defects, which may be found to exist at any stage of the work or after the same is completed, at his own cost.

11. **REMOVAL OF ALL OFFENSIVE MATTERS:**

All soil, filth or other matter of an offensive nature, taken out of any trench, sewer, drain, cesspool or other place shall not be deposited on the surface, but shall at once be carried out away by the contractor to some pits or place provided by them and shall be disposed off as per the rules and regulations of the Local authorities concerned.

12. **OPENING UP WORKS:**

The contractor shall notify the Architect in writing immediately, the trenches or excavation as shown on the drawings are get ready or as soon as any ground is cut into which, from unexpected causes, appears need for immediate attention. After notifying the Architect, he shall await instructions, which shall be given within ten days of receipt of such notice. If the contractor put in any parts of the foundations before he has so notified the Architect and received instructions, he shall be liable to reinstate all such work that may be subsequently, at any time, damaged on account of any defect or insufficiency of the foundations. The Contractor shall at the request of the Architect, within such time as the Architect so desires, open for inspection any work, and should the contractor refuse or neglect, to comply with such request, the employer, through the Architect may employ other workmen to open up the same. If the said work has been covered up in contravention of the Architect's instructions, or if, on being opened up, it be found in accordance with the drawings and specifications, or the instructions of the Architect or otherwise, the expenses of such other workmen shall be borne by and recoverable from the contractor, or may be deducted from any money due or which may become due to the contractor. If the work has not been covered up in contravention of such instruction, and be found in accordance with the said drawings and specifications and instructions, then the expenses aforesaid shall be borne by the Employer and be added to the contract sum, provided always that in the case of foundations or of any other urgent work so opened up and requiring immediate attention, the Architect shall within seven days after receipt of the written notice from the contractor that the work has been opened, make or cause the inspection thereof to be made, and at the expiration of such time, if such inspection shall not have been made, the contractor may cover the same and shall not be required to open it up again, except at the expenses of Employer.

Refer clause 7 & 25 of special conditions of contract.

13. **CONTRACTOR'S SUPERINTENDENCE & REPRESENTATIVE ON THE WORKS:**

The contractor shall give all necessary personal superintendence during the execution of the works and so long thereafter as the Architect may consider it necessary until the expiration of the "Defects Liability Period" stated in clause 24. The Contractor shall meet the Architect or his representative, whenever required and so informed by the Architect.

The Contractor shall maintain and be represented at site at all times, while the work is in progress, by a responsible and efficient foreman, approved by the Architect and who must thoroughly understand all the trades entailed and be constantly in attendance while the men are at work. Any directions, explanations, instructions or notices give by the Architect & Employer to such foreman shall be deemed to have been given to the contractor and shall be binding as such on the

contractor. The Foreman shall be thoroughly conversant with the English language and should be able to read, write and speak English.

14. **DISMISSAL OF WORKMEN:**

The contractor shall on the request of the Architect and Employer immediately dismiss from the works any person employed thereon who may, in the opinion of the Architect and Employer be unsuitable or incompetent or who may misconduct himself, and such person shall not again be employed or allowed on the works without the permission of the Architect & Employer.

15. **ACCESS TO WORKS:**

The Architect, the Employer and any person authorised by them shall at all reasonable times have free access to the works and to the workshops, factories or other places where materials are being prepared or constructed by the contract and also to any place where the materials are lying or from which they are being obtained. The Contractor shall give every facility to the Architect and the Employer and their representatives for inspection and examination and test of the materials and workmanship. No person, unless authorised by the Architect or the Employer, except the representatives of Public authorities, shall be allowed on the works at any time. If any work is to be done at a place other than the site of works, the contractor shall obtain the written permission of the Architect for doing so.

16. **EMPLOYER'S REPRESENTATIVE/PMC:**

The Employer may appoint an assistant to the Engineer, any Site Engineer or Project Management (PMC), who shall be the representative of the Employer. The duties of the Employer's representatives are to watch and supervise the works and to test any materials to be used and of workmanship employed in connection with the works. He shall have no authority either to relieve the contractor of any of his duties or obligations under the contract, or except those expressly provided hereunder, to order any work involving delay or any extra payment by the Employer or any variation of or in the works.

The contractor shall afford the Employer's representative every facility and assistance for examining the works and materials and checking and measuring item and materials. Neither the Employer's representative nor any assistant to the Architect shall have power to revoke, alter, enlarge or relax the requirements of this contract, or to sanction any new-work, additions, alterations, deviations or omissions unless such an authority may be specially conferred by a written order of the Architect and Employer.

The Employer's representative shall have to give notice to the Contractor or his representing about the non-approval of any work or materials and such works shall be suspended or the use of such materials should be discontinued until the decision of the Architect is obtained. The work will from time to time be examined by the Architect or the Employer's representative, but such examinations shall not in any way exonerate the contractor from the obligation to remedy any defects, which may be found to exist at any stage of the work or after the same is completed. Subject to the limitations of the clause, the contractor shall take instructions only from the Architect and Employer.

17. **ASSIGNMENT OF SUB-LETTING:**

The works included in the contract shall be executed by the contractor and the contractor shall not directly or indirectly transfer, assign or underlet the contract or any part/share thereof or interest therein without the written consent of the Architect and Employer, and no undertaking shall relieve the contractor from the full and entire responsibility of the contract or from active superintendence of the works during their progress.

18. **SUB-CONTRACTORS:**

All specialists, merchants, tradesmen, and others, executing any work or supply and fixing any goods for which prime cost prices or provisional sums are included in the Schedule of Quantities and/or specifications, who may be nominated or selected by the Architect and employer and hereby declared to be sub-contractors employed by the Contractor, are herein referred to as nominated sub-contractors. No nominated sub-contractors shall be employed on or in connection with the works, against whom the contractor shall make reasonable objection or (see where the Architect and contractor shall otherwise agree), who will not enter into a contract provided.

- a. The nominated sub-contractors shall indemnify the contractor against the same obligations in respect of the sub-contract as the contractor is under, in respect of this contract.
- b. The nominated sub-contractors shall indemnify the contractor against claims in respect of any negligence by the sub-contractor, his servants or agents or any misuse by him or them of any scaffolding or other plant, the property of the contractor or under any Workman's Compensation Act in force.
- c. Payment shall be made by the contractor to the nominated sub-contractor, within 14 days of receipt of the Architect's certificate, provided that before any certificate is issued, the contractor shall upon request furnish to the Architect proof that all nominated sub-contractor's account included in the previous certificates have been duly discharged; in default whereof the

Employer may pay the same upon a certificate of the Architect and deduct the amount thereof from any sums due to the contractor. The exercise of this power shall not create any contract between Employer and Sub-contractor.

19. **VARIATIONS NOT TO VITIATE CONTRACT:**

The contractor shall when directed in writing by the Architect, omit from or vary works shown upon the drawings or described in the specifications or included in the priced schedule of quantities, but the contractor shall not make any alterations or additions to or omissions from the works or any deviations from the provisions of the Contract without such authorizations or direction in writing from the Architect and Employer.

No claim for any extra item or deviations shall be allowed, unless it shall have been executed by the Authority of the Architect and Employer as herein mentioned. Any such extra item or deviation is hereinafter referred to as an authorised extra item or deviation. No variations i.e., additions, omissions or substitutions shall vitiate the contract.

The rate of items not included in the bill of quantities shall be settled by the Architect and Employer in accordance with the provisions of clause 21, hereof.

20. **MEASUREMENTS OF WORKS:**

The Architect/PMC may from time to time intimate the Contractor that he requires the works to be measured and the contractor shall forthwith attend or send a qualified agent to assist PMC/Architect's representative in taking measurements and calculations, and to furnish all particulars or give all assistance required by either of them.

Should the contractor not attend or neglect or omit to send such an agent, then the measurements and calculations, and to furnish all particulars or give all assistance required by either of them.

Should the contractor not attend or neglect or omit to send such an agent, then the measurements taken by the PMC/Architects representative approved by them shall be taken to be the correct measurements. The mode of measurements wherever not mentioned in contract documents be taken in accordance with the Indian Standard of Method of measurements of building works (I.S.1200 – 1958) and its revisions, if any. In case of any discrepancy between various contract documents on mode of measurements, the mode given in Bill of Quantities will take precedence over others.

The contractor or his agent may at the time of measurement take such notes and measurements as he may require.

All authorised extra works, omissions and all variations made without the Architect's knowledge, if substantially sanctioned by him in writing shall be included in such measurements.

21. **PRICES FOR SUBSTITUTIONS/EXTRA ETC., ASCERTAINMENT OF:**

Should it be found after the completion of the works from measurements taken (in accordance with the previous paragraph) that any of the quantities or amounts specified for the works in the priced schedule of quantities of work thus ascertained are less or greater than the amounts and/or tender or that any variations, is made, and any substituted/ extra (new) items have been executed, the valuation of such quantities/items, amounts or variations, unless previously or otherwise agreed upon, shall be made in accordance with the following rules:

- a. The net rates or prices in the original tender shall determine the valuation of the extra (additional quantities and or extra/substituted item of work), where that work is of a similar character and executed under similar conditions of the work priced therein. This applied to extra and substituted items of work to the extent, they are similar in nature to the items in the contract.
- b. The net prices given in the original tender shall determine the value of the items omitted, provided if omissions vary the conditions under which any remaining items of work are carried out, the prices for the same shall be valued under thereof.
- c. Where extra/substituted item of works are not of similar character (either partly & fully) and/or executed under similar conditions as aforesaid or where the omissions vary the conditions under which any remaining items of works are carried out or if the amount of any omission or additions relative to the amount of the whole of the contract works or to be any part thereof shall be such that in the opinion of the Architects the net rate or price contained in the priced schedule of quantities or tender or for any item of the work involves less or more beyond that reasonably contemplated by the Contractor or is by reason of such omission or addition rendered unreasonable for in-applicable, the Architect shall fix in consultation with the Employer such other rates or prices as in the circumstances he shall think reasonable and proper, which shall be final and binding on the contractor. For extra and substituted items this will apply for portions of the items for which, items of similar nature are not available in the contract.
- d. Where extra and or substituted items of work cannot be properly measured or valued, the contractor shall be allowed based on the net local day work rates and wages for the district and prevalent market rates for materials

etc., at the time of ordering that item; provided that in either case vouchers for wages paid specifying the daily time (and if required by the Architect, the workmen's name) and materials employed at or before the end of the week following that in which the work has been executed.

The measurements and valuations in respect of the extra and substituted items of work shall be completed within the "Period of final measurement" or within 3 (three) months from the completion of the contract works as defined under clause No.25 (certificate of virtual completion).

See Special Conditions of Contract Clause 43.

22. **UNFIXED MATERIALS:**

When any materials intended for the works shall have been placed at site by the contractor, such materials shall not be removed therefrom (except for the purposes of being used on the works) without the written authority of the Architect and Employer and when the contractor shall have received payment in respect of any certificate in which the architect shall have stated that he has taken into account the value of such unfixed materials on the works such materials shall become the property of the Employer and the Contractor shall be liable for any loss or damage to any such materials.

23. **REMOVAL OF IMPROPER WORK AND MATERIALS:**

The Architect shall, during the progress of the works, have power to order in writing from time to time the removal from the works, within such reasonable times as may be specified in the order, of any materials which in the opinion of the Architect and Employer are not in accordance with the specifications or the instructions of the Architect and Employer; and the substitution with proper materials and the removal and proper re-execution of any work, which has been executed with materials or workmanship, not in accordance with the contract/drawings and specifications or instructions etc., the contractor shall forthwith carry out such orders at his own cost. In case of default on the part of the contractor to carry out such orders, the Employer shall have the power to employ and pay other persons to carry out the same and all expenses consequent thereon or incidental thereto shall be borne by the Contractor, and shall be recoverable from the contractor by the Employer, or may be deducted by the Architect, from any money due or may become due to the contractor for this work or on any other account.

Instead of this procedure for work not done in accordance with the contract, the Architect and Employer may allow such work to remain, and in that case may make allowance for the difference in value together with such further allowance for damages to the Employer, as in his opinion may be reasonable. This

allowance shall be recoverable from the contractor by the Employer, or may be deducted by the Architect, from any money due or may become due to the contractor for this work or on any other accounts. The decision of Architects in these matters shall be final and binding on the contractor.

24. **DEFECTS AFTER COMPLETION:**

Any defect, shrinkage, settlement or other faults which may appear with in the “Defects Liability Period” stated in the Appendix on Page 10 i.e. within 12 months after the virtual completion of the works arising in the opinion of the Architect and the Employer, from materials or workmanship not in accordance with the contract, shall upon the directions and writing of the Architect and Employer and within such reasonable time as shall be specified therein, be rectified and made good by the Contractor at his own cost. In case of default, the Employer may employ any other person to amend and make good such defects, shrinkage, settlements or other faults. All damages, loss and expenses consequent therein or incidental thereto shall be made good and borne by the contractor and such damage, loss and expenses shall be recoverable from him by the employer or may be deducted by the Employer, the damages, loss and expenses from any sums that may be due to the contractor or amount retained under condition 36 (Certificate and payment) and in event of the amount retained being insufficient recover the balance from the amount held against EMD & Security deposit under clause 10.1 & 10.2 on Page 5 or any other amounts due or may become due later.

25. **CERTIFICATE OF VIRTUAL COMPLETION:**

The contractors shall intimate in writing to the Architects, as and when the works are complete in all respects in order to enable the Architect to intimate the Employer to take possession of the same. The works shall not be considered as virtually completed, until the Architect has certified in writing that the same have been “Virtually completed” and accepted by the employer. The defects liability period shall commence, only from the date of such virtual completion certificate.

26. **OTHER PERSONS ENGAGED BY THE EMPLOYER:**

The Employer reserves the right to use the premises and any portions of the site for the execution of any work not included in this contract which he may desire to carry out through other persons, and the contractor is to allow all reasonable facilities for the execution of such work, except by special arrangement with the Employer. Such work shall be carried out in such a manner a not to impede the progress of the works included in the contract, and the contractor shall not be

responsible for any damage or delay which may happen to or be occasioned by such work.

27. **INSURANCE IN RESPECT OF DAMAGE TO PERSONS AND PROPERTY:**

The contractor shall be responsible for all injury to persons, animals or things and for all structural and decorative damage to property, which may arise from operation or neglect of himself or any of his or sub-contractor's employees, whether or any other cause whatever in any way connected with the carrying out of this contract. This clause shall be held to include, interalia any damage to buildings, whether immediately adjacent or otherwise, any damage to roads, caused to the buildings and works forming the subject of this contract by frost or other inclement weather. The contractor shall indemnify the employer and hold him harmless in respect of all and any expenses arising from any such injury or damage to persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of government or otherwise, and also in respect of any award of compensation or damages consequent upon such claim.

The Contractor shall reinstate all damages of every sort mentioned in this clause, so as to deliver up the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damage to the property of third parties.

The contractor shall indemnify the Employer against all claims which may be made against the Employer, by any member of the Public or other party, in respect of anything which may arise in respect of the works or in consequence thereof and shall at his own cost, effect and maintain until one month after the works are taken over by the Employer or three months after the date of completion of the contract with an approved office, a policy of Insurance in the joint names of the Employer and the contractor against such risks and signing of the contract. The contract shall also indemnify the employer against all claims which may be made upon the Employer whether under the Workmen's compensation act or any other statute in force during the currency of this contract or at common law in respect of any employees of the contractor or of any sub-contractor and shall at his own expense effect and maintain until one month beyond the virtual completion of the contract, with an approved office. A policy of Insurance in the joint names of the Employer and the Contractor against such risks and deposit such policy or policies with the Architects from time to time, during the currency of the contract. In default of the contractor insuring as provided above, the Architect on behalf of the Employer may so insure and may deduct the premiums paid from any money due or which may become due to the contractor.

The contractor shall be responsible for anything which may be excluded from the Insurance Policies above referred to and also for all other damages to any property arising out of and incidental to the negligent or defective carrying out of this contract however, such damage shall be caused.

The Contractor shall also indemnify the Employer in respect of any costs, charges or expenses arising out of any claim or proceedings and also in respect of any Award of or compensation of damages arising there from.

The Employer with the concurrence of the Architect shall be at liberty and is hereby empowered to deduct the amount of any damages, compensations, costs, charges and expenses arising or occurring from or in respect of any such claims of damages from any sums due or to become due to the contractor.

28. **CONTRACTOR'S ALL RISK POLICY:**

The contractor shall within 14 days from the date of commencement of the work insure the works at his cost and keep them insured until one month after the works are taken over by the Employer or three months after the date of completion whichever is earlier, against loss or damage by fire and usual risks other than fire against which insurers generally provide cover in a CONTRACTOR'S ALL RISK POLICY, with an insurer to be approved the Architects, in the joint names of the Employer and contractor (the name of the former being placed first in the policy), progressively for the full amount of the contract, in three stages, beginning with 1/3 of the contract value, and for any further sum as called upon to do so by the Architect, with the prior written consent of the Employer, the premium of such further sum being allowed to the contractor as an authorised extra. Such policy shall cover the property of the Employer only and Architects and surveyor's fees for assessing the claim and in connection with his services generally in reinstatement and shall not cover any property of the contractor of any subcontractor or employee. The contractor shall deposit the policy and receipts for the premiums paid with the Architects, within twenty one days of the date of commencement of work, unless otherwise instructed, as provided above failing which the employer or the Architect on his behalf may insure and may deduct the premium paid from any money that may be due or that may become due to the contractor. The contractor shall as soon as the claim under the policy is settled, or the work reinstated by the insurers should they elect to do so, proceed with all due diligence with the completion of the works in the same manner as though the fire or other such risk had not occurred and in all respects under the same conditions of contract.

The contractor in case of rebuilding or reinstatement after fire or other such usual risk shall be entitled to such extension of time for completion as recommended by the Architect.

Please refer Special Conditions of Contract, clauses.

29. **COMMENCEMENT AND COMPLETION:**

The contractor shall be allowed admittance to the site on the “Date of Commencement” stated in the Appendix, and he shall thereupon and forthwith begin the works and shall regularly proceed with and complete the same (except such painting or other decorative work as the Architect may desire to delay) on or before the ‘Day of Completion’ started in the Appendix subject nevertheless to the provisions for extension of time hereinafter contained.

Refer clause 9 & 37 of Special Conditions of Contract.

30. **DELAY AND EXTENSION OF TIME:**

If in the opinion of the Architect the works be delayed:

- a. by force majeure, or
- b. by reason of any exceptionally inclement weather, or
- c. by reason of proceedings taken on threatened by or dispute with adjoining or neighbouring owners or public authorities arising otherwise, than through the contractor’s own default, or
- d. by the works or delays of the contractors or tradesmen engaged or nominated by the Employer or Architect and not referred to in the Schedule of Quantities and/or specifications, or
- e. by reason of civil, commotion, local combination of workmen or strike or lock-out affecting any of the buildings/traders, or
- f. by reason of the Architect’s instructions as per clause 2, or
- g. In consequence of the contractor not having in due time, necessary instructions from the Architect, for which he shall have specifically applied in writing ahead of time, giving reasonable time to prepare such instructions.

The Architect shall make a fair and reasonable assessment for extension of time, for completion of the contract works which may be approved by the Employer.

In case of such strike or lock-out, the contractor shall as soon as possible, give written notice thereof to the Architect, but the contractor shall nevertheless constantly use his endeavours to prevent delay and shall do all that may

reasonably be required, to the satisfaction of the Architect to proceed with the work.

31. **DAMAGES FOR NON-COMPLETION:**

If the contractor fails to complete the works by the date stated in clause 29 (date of completion) or within any extended time certified under clause 30 (extension of time) and if the Architect shall certify in writing on or before the date of issue of the certificate for the last payment to which the contractor may become entitled hereunder that the works could have been reasonably completed by the said date or within the said extended time, then the contractor shall pay to the Employer or allow the employer to recover from dues to the contractor on any account the sum stated in clause 17 of "Notice to contractors" (Page 7) (liquidated damages and not by way of penalty), subject to a maximum amount of 5% as stated in Appendix of General Conditions of contract (page 11) and as stated in clause 17 of "Notice to contractors"(Page 7) and such damages may be deducted from any money due or which may become due to the contractor.

The deduction of such sums shall not, however, absolve the contractor of his responsibility and obligations to complete the work in its entirety.

Please refer clauses 9 & 37 of special conditions of contract.

32. **FAILURE BY CONTRACTOR TO COMPLY WITH ARCHITECT'S INSTRUCTIONS:**

If the contractor after receipt of written notice from the Architect requiring compliance with such further drawings and/or Architects instruction, fails within seven days to comply with the same, the Architect and Employer may employ and pay other persons to execute any such work whatsoever as may be necessary to give effect thereto and all costs incurred in connection therewith shall be recoverable from the contractors by the employer on a Certificate by the Architect as a debit or may be deducted by him from any money due or which may become due to the contractors.

33. **ARCHITECT'S DELAY IN PROGRESS:**

The Architect may delay the progress of the works in case of rains or otherwise, without vitiating the contract and grant such extension of time with the approval of the Employer for the completion of the contract as he may think proper and sufficient in consequence of such delay, and the contractor shall not make any claim for compensation or damage in relation thereto.

34. **SUSPENSION OF WORKS:**

If the contractor, except on account of any legal restraint upon the employer preventing the continuance of the works, or on account of any of the causes mentioned in the clause "Extension of time" or in the case of certificate being withheld or not paid when due, shall suspend works or in the opinion of the Architects, shall neglect or fail to proceed with due diligence in the performance of his part of the contract or if he shall more than once make default in the respects mentioned in clause 23 (removal of improper work and materials), the Employer through the Architect shall have the power to give notice in writing to the contractor required that the works be provided within a reasonable manner, and with reasonable despatch, such notice shall not be unreasonably given and must signify that it purports to be a notice under the provisions of this clause and must specify the acts or defaults on the part of the contractor upon which it is based. After such notice shall have been given, the contractor shall not be at liberty to remove from the site of works, or from any ground contiguous thereto, the site of works, or from any ground contiguous thereto, any plant or materials belonging to him which shall have been placed thereon for the purpose of work, and the Employer shall have lien upon such plants and materials to subsist from date of such notice being given until the notice shall has been complied with, provided always that such line shall not under any circumstances subsist after the expiration of 30 (thirty) day from the date of such notice given, unless the employer shall have entered upon and taken possession of the works and site, as hereinafter provided.

If the contractor shall fail for seven days after such notice has been given, to proceed with the works as therein prescribed, the Employer may enter upon and take possession of the works and site, and of all such plants, machinery and materials thereon intended to be used for the works, and the Employer shall retain and hold a lien upon all such plants, machinery and materials until the work shall have been completed, under powers hereinafter conferred upon him;

If the Employer shall exercise the above power, he may engage any other person to complete the works and exclude the contractor, his agents and servants from entry upon or access to the same, except that the contractor or any person appointed in writing may have access at all times during the progress of the works to inspect, survey and measure the works. Such written appointments or a copy thereof shall be delivered to the Architects before the person appointed comes on to the works and the Employer shall take such steps as in the opinion of the Architect may be reasonably necessary for completion the works, without undue delay or expenses using for that purpose the plant, machinery and materials above mentioned in so far as they as they are suitable and adopted to such use.

Upon the completion of the works, the Architects shall certify the amount of the expenses properly incurred consequent on and incidental to the default of the contractor as aforesaid and in completion the works by other persons.

Should the amount so certified as the expenses properly incurred be less than amount which should have been due to the contractor upon the completion of the works by him, the difference shall be paid to the contractor by the Employer, should the amount of the former exceed the later, the difference shall be paid by the contractor to the Employer. The Employer shall not be liable to make any further payments or compensations to the contractor for or on accounts of the proper use of the plant for the completion of the works under the provisions herein before mentioned other than such payments as is included in the contract.

After the works shall have been so completed by persons other than the contractor, under the provisions herein before contained, the Architect shall give notice to the contractor to remove his plan and all surplus materials as may not have been used in the completion of the works from the site.

If such plant and materials are not removed within a period of 14 days after the notice shall have been given, the Employer may remove and sell the same, holding the proceeds less the cost of the removal and sale, to the credit of the contractor. The Employer shall not be responsible for any loss sustained by the Contractor from the sale of the plant in the event of the Contractor not removing it after notice.

35. **PRIME COST AND PROVISIONAL SUMS:**

- a. Where “Prime Cost” (P.C.) prices or provisional sums of money are considered for any goods or works in the specifications or Schedule of quantities or deviations hereof, the same are exclusive of any trade discounts, or allowances, discount for cash, or profit which the contractor may require and or carriage and fixing.
- b. All goods or work, for which prime cost prices or provisional sums of money are considered may be selected or ordered from any manufacturer’s or firms, at the discretion of the Architect or the Employer. The Employer reserves to himself the right of paying directly for any such goods or work and the Architect may deduct the said prices or sums from the amount of the contract. Should any goods or works for which prime cost prices or provisional sums are considered or portions of same be not required, such prices or sums, together with the profits allowed for such additional amount as the Contractor may have allowed for carriage and fixing will be deducted in full from the amount of the Contract. Whether the goods be ordered by the Contractor or otherwise, the contractor shall at his own cost fix the same, if called upon to do so, and the contractor shall also receive and sign for such goods and be responsible for their safe custody as and from the date of their delivery upon the works.
- c. In cases in which provisional quantities of items/materials are contained in the contract, the contractor shall provide such materials and or execute such items to

such amounts or to greater or lesser amounts as the Architect shall direct in his schedule of quantities.

- d. No prime cost sum or sums (or any portion thereof) shall be included in any certificate for payment to the contractor until the receipted accounts relating to them have been produced by the contractor to the Architect. Such accounts shall show all discounts and any sum or sums in respect of such discounts shall be treated as a trade discount. Provided always, that should the contractor in lieu of producing such receipted accounts, request the Architect in writing to issue a certificate to the Employer for such sum or sums, due either on account or in settlement to a sub-contractor direct, the Architect shall, upon satisfying himself that the sub-contractor is entitled to the same, so issue the certificate and such sum or sums be deducted from the amount of the contractor, at the settlement of accounts and any profit or sum to which the contractor is properly entitled, in respect of such sub-contract, and which is in conformity with the terms of contract as though the amount of such certificates to the sub-contractor has been included in a certificate drawn in favour of the contractor.
- e. If the contractor neither produces the receipt nor gives authority to the Architect to issue a certificate in favour of such sub-contractor direct, the Architect may upon giving the contractor SEVEN DAYS NOTICE in writing of his intentions to do so, issue to the sub-contractor such certificate direct to the Employer and obtain a receipt from the sub-contractor, which receipt shall be deemed as a discharge for the amount of such certificates, as though given by the contractor. In such event, the contractor shall not be allowed any profit he may have added in the Schedule of Quantities upon such sub-contract.
- f. The exercise of the option before referred to by the Contractor and the issue of certificates, as before described to sub-contractor direct of certificates by the Architect, shall not however, relieve the contractor from any of the liabilities in respect of insufficient, faulty or incompleting work of the sub-contractor for which he may be liable under the terms of the contract.

36. **CERTIFICATES AND PAYMENTS:**

The contractor shall be paid by the Employer after due checking and after making necessary correction from time to time, by instalments under Interim Certificates to be issued by the Architect on account of the works executed by the contractor based on the joint measurements taken by the PMC, the Architects representative and the contractors representative when in the opinion of the Architect, work to the approximate value named in the Appendix on Page 11 as "Value of work for Interim Certificates", (or less at the reasonable discretion of the Architect & Employer) has been executed in accordance with the Contract, subject however, to a retention of the percentage of such value named in the Appendix hereto mentioned as "Retention Percentage for Interim Certificates", until the total

amount retained shall reach the sum named in the appendix as Total Retention Money, after which time the instalments shall be upto the full value of the work subsequently so executed plus such amount as he may consider proper on account of materials delivered upon the site by the contractor for use in the work and available on the date of billing.

And when the works have been virtually completed and the Architect shall have certified in writing that they have been so completed, the contractor shall be paid by the Employer after satisfying himself in accordance with the certificate to be issued by the Architect, the sum of money named in the Appendix as 'Instalment after Virtual Completion' being a part of the said Total Retention Money.

The Contractor shall be entitled to the payment of the final balance (balance security deposit/retention money) in accordance with the final certificate to be issued in writing by the Architect at the expiration of the period referred to as 'The Defects Liquidation Liability period' in appendix on page 11 hereto, from the date of virtual completion or as soon after the expiration of such period as the work shall have been finally completed and all defects made good according to the true intent and meaning hereof, whichever shall happen, provided always that the issue by the Architect of any Certificate during the progress of the works or after the completion shall not relieve the contractor from his liabilities in cases of fraud, dishonesty or fraudulent concealment relating to the works or materials or any matter dealt within the certificate, and in case of all such defects and insufficiencies in the works or materials, which reasonable examination would have disclosed. No certificate of the Architect shall by itself be conclusive evidence that any works or materials to which it relates are in accordance with the contract.

The Architect shall have power to withhold any Certificate, if the works or any parts thereof are not being carried out to his and employers satisfaction. The Architect may by any certificate make any correction in any previous Certificate, which shall have been issued by him. Payment upon the Architect's Certificates shall be made within the period named in the Appendix as 'Period of Honoring of Certificates, after such certificates have been delivered to Employer.

Please refer clause 38 & 47 of Special conditions of agreement.

37. **NOTICES:**

Notices for the Employer, the Architect, or the Contractor may be served in person by obtaining a personal endorsement or may be sent to their respective Registered Office addresses by registered post with acknowledgment due, or may be sent to an address specified by them by registered post with acknowledgement due. Any notice sent by registered post shall be deemed to have been served at the time when in ordinary course of time it would be delivered.

38. **TERMINATION OF CONTRACT BY THE EMPLOYER:**

If the contractor being an individual or a firm, commit any act of insolvency, or shall be adjudged as Insolvent or being an incorporated Company shall have an order for compulsory winding up made against it or pass an effective resolution for winding up voluntarily or subject to the Supervision of the Court and of the Official Assignee of the Liquidator in such acts of insolvency or winding up, shall be unable within seven days after notice to him requiring him to do so, to show to the reasonable satisfaction of the Architect that he is able to carry out and fulfill the contract, and to give security thereof, if so required by the Architect.

Or if the contractor (whether an individual, firm or incorporated Co.) shall suffer execution to be issued.

Or shall suffer any payment under this contract to be attached by or on behalf of any of the creditors of the contractor.

Or shall assign or sublet this contract without the consent in writing of the Architects/Employer first obtained.

Or shall charge or encumber this Contract or any payments due or which may be due to the Contract thereunder.

Or if the Architect shall certify in writing to the Employer that the contractor,

- a. has abandoned the contract or
- b. has failed to commence the works, or has without any lawful excuse under these conditions suspended the progress of the works for 14 days, after receiving from the Architect written notice to proceed, or
- c. has failed to proceed with the works with such due diligence and failed to make such due progress as would enable the works to be completed within the time agreed upon, or
- d. has failed to remove materials from the site or to pull down and replace work for 7 days after receiving from the Architect written notice that the said materials or work were condemned and rejected by the Architect under these conditions, or
- e. has neglected persistently to observe and perform all or any of the acts, matters or things by this contract to the observed and performed by the Contractors for 7 days after written notice shall have been given to the contractor requiring the contractor to observe or perform the same, or

- f. has to the detriment of good workmanship or in defiance of the Architect's instructions to the contrary, sublet any part of the contract.

Then and in any of the said cases the Employer with written consent of the Architect, may notwithstanding any previous waiver, after giving 7 days notice in writing to the contractor, determine the contract, but without hereby affecting the powers of the Architect to continue in force as full as if the contract has not been so determined and as if the works subsequently executed has been executed by or on behalf of the contractor.

And further, the Employer under recommendations of the Architect, by his Agents, or servants may enter upon and take possession of the works and all plants, tools, scaffoldings, sheds, machinery, and other equipment and materials also laying upon the premises or the adjoining lands or roads, and use the same as his own property or may employ the same by means of his own servants and workmen in carrying on and completion the works or by employing any other contractors or other persons to complete the works and the contractor shall not in any way interrupt or do not act, matter or thing to prevent or hinder such other contractor or other persons or person employed for completing and finishing or using the materials and plant for the works. When the works shall be completed or soon thereafter as convenient, the Architect shall give a notice in writing to the contractor to remove his surplus materials and plant, and should the contractor fail to do so, within a period of 14 days, after receipt thereof by him, the Employer shall sell the same by publication and shall give credit to the contractor for the amount realised. The Architect shall thereafter ascertain and certify in writing under his hand when (if anything) what shall be due to or payable by the Employer for the value of the said plant and materials so taken possession of by the Employer, and the expense or loss, which the Employer shall have incurred due to the contractor, and the amount which shall be so certified shall thereupon be paid by the Employer to the contractor or by the contractor to the Employer, as the case may be.

39. **TERMINATION OF CONTRACT BY CONTRACTOR:**

If payment of the amount payable by the Employer under certificate of the Architect as provided for hereinafter shall be in arrears and unpaid for 30 (thirty) days after notice in writing requiring payment of the amount, as aforesaid shall have been given by the Contractor to the Employer, or if the Employer obstructs the issue of any such certificates, or if the employer commits any Act of insolvency, or if the Employer (being an incorporated company) shall have an order made against him or pass an effective.

Resolution for winding up, either compulsorily or subject to the supervision of the Court or voluntarily, or if the Official Liquidator or the Employer shall repudiate

the contract, or if the if the Official Liquidator in any such winding up shall be unable within 15 days notice to him requiring him to do so, to the reasonable satisfaction of the contractor that he is not able to carry out and fulfill the contract and to give security for the same (including Earnest money), or if the works be stopped for any payments due, and to become due thereunder and if required under the order of the Architects or the Employer or by an injunction or other order of any court of law, then in any of the said cases, the contractor shall be at liberty to determine the contract by notice in writing to the Employer/Architect, and he shall be entitled to recover from the Employer, payment for all works executed and for any losses he may sustain, upon any plant or materials supplied or purchased or prepared for the purpose of the contract.

In arriving at the amount of such payment, the net rates contained in the contract shall be followed, or where the same may not apply, valuation shall be made in accordance with clause 21 thereof.

40. Matters to be finally determined by the Architects and the Employer (Called excepted matters) – (refer 41(a) below), which shall be final, conclusive and binding on the following matters:
- a) Instructions
 - b) Transactions with local authorities
 - c) Proof of quality of materials
 - d) Assigning or underletting of the contract,
 - e) Certificate as to the causes of delay on the part of the contractor and justifying extension of time or otherwise,
 - f) Rectification of defects pointed out during the defects liability period.
 - g) Notice to the contractor to the effect that he is not proceeding with due diligence.
 - h) Certificate that the contractor has abandoned the contract.
 - i) Notice for determination of the contract by the Employer.

41. **ARBITRATION:**

- a. All disputes or differences of any kind whatsoever, which shall at any time arise between the parties hereto touching or concerning the works or the execution or maintenance thereof this contract, or the rights touching or of this contract, effect thereof, or to the rights or liabilities of the parties arising out of or in relation thereto, whether during progress or after determination, foreclosure or breach of the contract (other than those in respect of which the decision expressed to be final and binding in cases listed out in condition 40 above), Architects shall, after written notice to either party to the contract and to the appointing Authority, who shall be appointed for this purpose by the employer refer those disputes for adjudication to a sole arbitrator, to be appointed as hereinafter provided.

- b. For the purpose of appointing the sole arbitrator referred to above, the Appointing authority will send, within thirty days of receipt by him of the written notice aforesaid, to the contractor a panel of three names of persons, who shall be presently unconnected with the organisation for which the work executed.
- c. The contractor shall on receipt by him of the names as aforesaid, select any one of the persons named to be appointed as a sole arbitrator and communicate his name to be appointed as a sole arbitrator to the Appointing Authority, within thirty days of receipt of the names by him. The Appointing Authority shall thereupon without any delay appoint the said person as the sole arbitrator. If the contractor fails to communicate such selection as provided above within the period specified, the Appointing Authority shall make the selection and appoint the selected person as the sole arbitrator.
- d. If the Appointing Authority fails to send to the contractor the panel of three names as aforesaid within the period specified, the contractor shall send to the appointing authority a panel of three names of persons, who shall be unconnected with either party. The Appointing Authority shall on receipt by him of the names as aforesaid select any one of the persons named and appoint him as the sole arbitrator. If the Appointing Authority fails to select the person and appoint him as the sole arbitrator within 30 days of receipt by him of the panel and inform the contractor accordingly, the contractor shall be entitled to appoint one of the persons from the panel as the sole arbitrator and communicate his name to the Appointing Authority.
- e. If the Arbitrator so appointed is unable or unwilling to act or resigns his appointment or vacates his office due to any reasons whatsoever, another sole arbitrator shall be appointed as aforesaid.
- f. The work under the contract, shall however, continue during the arbitration proceedings and no payment due or payable to the contractor shall be withheld on account of such proceedings.
- g. The arbitrator shall be deemed to have entered on the reference, on the date he issues notice to both the parties, fixing the date of first hearing.
- h. The arbitrator may from time to time, with the consent of the parties, enlarge the time for making and publishing the award.
- i. The Arbitrator shall give a separate award in respect of each dispute or difference referred to him. The Arbitrator shall decide each dispute in accordance with the terms of the contract and give a reasoned award. The venue of arbitration shall be such a place, as may be fixed by the Arbitrator in his sole discretion.

The fees, if any, of the Arbitrator, if required to be paid before the award is made and published, shall be paid half and half by each of the parties. The costs of the

reference and of the award including the fees, if any, of the Arbitrator, who may direct to any by whom and in what manner such costs or any part thereof shall be paid and may fix or settle the amount of costs to be so paid.

- j. The award of the Arbitrator shall be final and binding on both the parties.
- k. Subject to aforesaid, the provisions of the Arbitration and Conciliation Act, 1996, or any statutory modifications or re-enactments thereof, and the rules made thereunder, and for time being in force, shall apply to the arbitration proceedings under this clause.

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SPECIAL CONDITIONS OF CONTRACT

1. INSPECTION OF DRAWINGS:

Before filling in the tender, the contractor will have to check up all drawings and Schedule of quantities, and will have to get immediate clarifications from the Architect on any point, that he feels is vague or uncertain. No claim/damages or compensation will be entertained on this account.

2. CONTRACTOR TO VISIT SITE:

Each tenderer must, before submitting his tender, visit the site of works, so as to ascertain the physical site conditions prices and availability and quality of materials according to specifications before submitting the quotations. No excuse regarding non-availability of any materials or changes in the price will be entertained or extra allowed on that account.

The existing adjacent buildings belonging to Govt/private are in close proximity of the proposed construction, hence the contractor shall cater for all arrangements to carry out the work without causing any disturbance to the occupants by providing screens with bamboo matting or other suitable material approved by Architects/Engineer. The contractor shall ensure that no dust or construction material falls near/around the existing buildings.

3. EXECUTION OF WORK (PRICES TO INCLUDE):

- i) The whole of the work as described in the Contract (including the Schedule of Quantities, the specifications and all drawings pertaining thereto) and as advised by the Architect & employer from time to time is to be carried out and completed in all its parts to the entire satisfaction of the Architect & Employer. Any minor details of construction, which may not have been definitely referred to in this contract, but which are usual in sound building, road and all construction practice and essential to the work, are deemed to be included in this contract. Rates quoted in the Schedule shall be inclusive of all freights, taxes, such as octroi, Sales tax, Royalties, duties, excise, turnover tax, sales tax on works contract, etc., as well as transportation, so as to execute the contract as per the rules and regulations of Local Bodies, State Government and Government of India. Any increase in these taxes and rates, during pendency of contract, shall be borne by the contractor and no extra claim on this account will be entertained.

The rates quoted in the tender should also include all charges for:

- a) 1. Carrying
 2. Hauling
 3. Labour

4. Fixing
5. Watering
6. Cleaning
7. Making good and
8. Maintenance etc.

- b) The contractor should arrange timely at his cost for all required.
- i) Plant, machinery, scaffolding, formwork, ladders, ropes, nails, spikes, shuttering, temporary supports, platforms, tools, all materials etc., required for executing the work, and protecting them from weather and other normal/natural causes.
 - ii) Covering/protecting for the walling and other works, during inclement weather, strikes etc., as and when necessary and or as directed.
 - iii) All temporary canvas covers/covering, lights, tarpaulin, barricades, water shoots etc.
 - iv) All stairs and steps, thresholds and any other requisite protection for the works.
 - v) All required temporary weather-proof sheds at such places and in a manner approved by the Architect, for the storage and protection of materials, against the effects of sun and rain.
 - vi) All required temporary fences, lighting/sign-boards etc., guards, approaches and roads as may be necessary for execution of the contract works and for safeguarding the public.
 - vii) The whole of necessary plant and machinery like bull dozers, graders, road rollers, bitumen heating plants, blowers, pumps, concrete mixers, hoists, vibrators, scaffolding, formwork, tackle, cartage, labour etc., and removal of the same at the completion of works.
 - viii) Dewatering by bailing out or pumping out the water from foundation/trenches during the progress of work anywhere on site, to the satisfaction of the Architect & Employer: and clearing of the site.
- c) The Architect & Employer will be the sole judge in deciding as to the suitability or otherwise of the tools/formwork/machinery or plant that may be brought to the work site by the contractor for the proper execution of the work.

- d) The rates quoted by the tenderer in the Schedule of Probable items of work will be deemed to be for the finished work.

4. **R.C.C.WORKS:**

The contractor shall carry out all the RCC works, including formwork, strictly in accordance with drawings, details, relevant BIS specifications, and instructions of the Architects/Employer/Consulting Engineer. If any changes have to be made in the RCC designs, the contractors shall carry out the same without any extra charge. The Architect & Employer's decision in such cases shall be final and shall not be open to arbitration.

5. **SCHEDULE OF QUANTITIES:**

The Schedule of quantities forms part of the contract, but the Employer reserves the right to modify the same or any part thereof as per variation clause stated herein below. The contractor shall not be allowed any compensation or damages for the work which is so omitted or cancelled or added or substituted by the Architect & Employer.

Please refer clause 4 of General Conditions of Contract.

6.a. **QUANTITIES LIABLE TO VARY:**

This clause applies for unlimited variations (+ or -) for items of foundations and those executed below plinth level. For all other items, only in case where + variations of any item exceeds 100% of Quantities of respective items given in the schedule of quantities of the contract, such additional quantities of those items shall be treated as extra items and valued as per clause 45 of special conditions of contract, considering of that rates for these items cannot be derived from the contracted items of work.

The quantities indicated in the bill of quantities are only approximate, and hence may vary on either side (+ or -) for accomplishing the works enunciated under the scope of works, in accordance with designs, drawings and specifications and or instructions of the Architect & Employer. Variations may also occur, consequent upon addition or deletion or substitution of particular items, change of designs or specifications during the course of execution. The contractor, in either case, is bound to carryout the modified quantities upto +100% (plus one hundred percent) variation, without any enhancement in rates and at the same rates as per accepted original tendered rates.

Please refer clause 4, 5 & 6 of General conditions of contract.

b. **FILLING OF TENDERS:**

The rates and amounts for each tendered item should be filled in separate columns provided for in the Schedule of quantities and all the amounts should be totaled up in order to show the aggregate value of the entire tender. All rates shall be filled in both words and figures. These figures and words shall be preceded by 'Rs' and 'Ps' as the case may be, and while filling in words, must end with "Only". Example:

- i) Rs.15.25 (Rupees fifteen and paise twenty five only)
- ii) Rs.20.00 (Rupees twenty only)

The rates quoted in figures should clearly show the rates in full. While filling rates in words, each line should end in '-', and if continued further, last line for the rate of each item shall end in "Only". All corrections, by the contractor in the tender schedule shall be duly attested by the initials of the tenderer. Corrections which are not attested or overwritings in rates may entail the rejection of the tender.

In case the rate written in figures/words/amount differs, the following procedure shall be followed:

- a) When there is a difference between the rates in figures and in words, the rates which correspond to the amounts worked out by the contractor will be taken as correct.
- b) When the amount of an item is not worked out by the contractor or it does not correspond with the rate written either in figures or in words, then the rate quoted by the contractor in words shall be taken as correct.
- c) When the rates quoted by the contractor in figures and in word tallies but the amount is not worked out correctly, the rate quoted by the contractor shall be taken as correct and not the amount.

7. **ACCESS OF INSPECTION:**

The contractor is to provide at all times, during the progress of the works and the maintenance period, means of access with ladders, gangways etc., and the necessary attendants to move and adopt the same as directed for the inspection or measurement of the work by the Architect and Employer or any other agency employed by the client.

Refer clause 7 of General Conditions of Contract.

8. **DIMENSIONS:**

In all cases figured dimensions are to be accepted in preference to scaled sizes. Large scale details shall take precedence over small scale details/drawings. In case of any discrepancy, the contractor shall ask for a clarification, before proceeding with the work. Accordingly, if any work is executed without prior clarification, it is liable to be rejected and shall not be paid for,

9. **PROGRAMME OF WORKS:**

The contractor on starting the work shall furnish to the Employer and Architect a PERT/CPM programme, for carrying out the work stage by stage in the stipulated time, for the approval of Architects and Employer, and follow strictly the approved time schedule by incorporating changes, if any, so authorised by the Architect and Employer, to ensure the completion of construction work ins stipulated time. A graph or chart on individual item/group of items/trades of work shall be maintained, showing the progress both in terms of quantities and value, week by week. The contractor shall submit to the Employer and Architect a weekly progress report stating the number of skilled and unskilled labourers employed on the work, working hours done, quantity of cement, steel and other major items of materials (quantity and value wise) used and corresponding place, type and quantity of work done during the period.

The contractor must inform the Architects, 10 days in advance of requirement of respective drawings and details by him, from time to time. The contractor shall strictly adhere to the approved programme and arrange for the materials and labour etc., accordingly.

Despite repeated instructions, if the contractor fails to show satisfactory progress of the work, the Employer/Architect may take suitable action as deemed fit, including levying of liquidated damages not exceeding ½% of contract price for delay of every week or part thereof, subject to a limit of total liquidated damages levied under this clause to 5% of contract price without prejudice to any terms and conditions of the contract.

Please refer clause 29 & 30 of General Conditions of contract.

10. **OFFICES, STORES, SHEDS ETC., ON THE SITE:**

- a. The contractor shall erect and maintain entirely at his own expense properly lighted, ventilated waterproof and lockable aircooled offices for the Architect's/ Employers representatives and for his own staff respectively on such parts as the Architects shall indicate. Separate offices for Architects and Employers representatives shall be constructed having minimum area of 20 Sqm, as per the sketch plan and specifications, which will be given by the Architects before starting the work. Contractor shall also provide and maintain, at his own cost, adequate water supply, closets

and sanitary accommodation for exclusive use of Architect & Employer's representatives at site. In case, these offices have been provided with AC/GI sheet roofing, the same shall have false ceiling as directed. These offices shall be provided by the contractor with adequate numbers of windows, tables, chairs, steel cupboards, fans, lights and attendants etc., as directed by the architects. Necessary permission from various authorities will be obtained by the contractor and necessary fees shall be paid by the contractor prior to constructing such offices, and as well for stores, huts for labourers or any other temporary structures required for the due execution of work. Any penalty levied by local authorities, for not following their bye-laws/regulations etc., in the matter, will be borne by the contractor. The contractor shall pay for the Electricity and Water charges consumed. All these offices shall be demolished and the materials shall be taken away from site and ground left in good and proper order on completion of work, as required and directed.

- b. The contractor shall provide for all necessary storage on the site, in a specified area for all materials, in such a manner that all such materials, tools etc., shall be duly protected from damages by weather or any other cause. Stores for storage of cement shall have all weather proof floors, walls and roof and have proper locking arrangements and must be secure. All these must be maintained till the work is completed and so certified by the Architect. Necessary and adequate watch and ward for all such accommodations and stores shall be provided for by the contractor at his cost and same included in the rates/amounts quoted by him. All such stores shall be cleared away and the ground left in good and proper order on completion of this contract unless otherwise expressly mentioned herein.
- c. All materials which are stored on the site such as cement, brick, metal sand etc., shall be stacked in such a manner as to facilitate rapid and easy checking of quantities of such materials and prevent deterioration in quality due to water etc.
- d. In addition to the offices provided to Architect's Employer's representative, contractor shall provide accommodation for Project Management s as specified.

11. **WATER AND ELECTRICITY:**

Contractor shall make his own and adequate arrangements for water required for drinking and construction purposes and also for required electric supply at site for satisfactory execution and completion of the work, at his own cost. The contractor shall get the water used for construction purpose tested periodically as per relevant BIS codes at his cost, and shall get the same approved from Architect and clients before using such water for the work.

12. **PROCUREMENT OF MATERIALS:**

Contractor shall procure all the materials including cement and steel required for the work from the open market. Time is the essence of the contract. Acceptance of the completion date by the contractor shall mean that he has taken into consideration the availability of all materials of approved make and quality in sufficient quantities at respective markets/sources, to enable him to complete the entire work in the stipulated period.

Contractor will get samples of all materials approved by the Architect and employer, before placing order/purchase/procurement. They shall conform to relevant B.I.S. codes and or tender specifications as applicable.

For all materials, the contractor shall quote for the best quality of the materials of best make/source or supply and they should be got approved by the architect and employer, before procurement.

In case sufficient quantities of approved quality materials from approved sources are not available in time, contractor may have to procure the same from neighbouring areas even with longer leads, as required and directed, at no extra cost. In case approved good quality sand is not available consistently throughout the duration of the contract period, best quality of sand locally available may have to be screened and washed, as directed by the Architect and Employer depending upon the use of sand in different items of work, at no extra cost. The materials will be, however as per relevant I.S.S. as and wherever applicable.

Please refer clause 9 of General Conditions of contract.

12.1 **SECURED ADVANCE FOR MATERIALS ON SITE:**

The contractor will be paid secured advance against the materials required and brought and stacked safely and securely at site for consumption within 45 days. The advance paid shall be limited to 75% of the cost (limited to costs of materials based on quoted and approved rate for relevant items of work) of the materials stacked at site, and the contractor shall produce necessary cash vouchers/documents in support of the cost of each of such materials for each consignment. In case of sanitary, Water supply and electrical quoted rates for the relevant items in the tender and not exceeding 75% of the cost of those materials in the market. Whenever payment is made on stack measurement basis, necessary deductions for voids will be made, which shall be applicable both for advance and/or for final payment, wherever applicable. These materials shall be stacked on fairly level ground and at safe and secure places, as directed. No secured advance will be paid for materials brought prematurely to the site.

The materials against which advance is paid, shall be the property of the Employer and shall not be removed from the site, without written permission of the Architect & Employer. However, the security of these materials and preventing deterioration of quality of same, shall be the sole responsibility of the contractor. The materials shall also be in conformity with the contract specifications and of approved quality/make/brand etc.

The secured advances shall be recovered in the next immediate interim bill.

These advances shall be made on the basis of the quantity of each of the materials lying at site, at the time of preparation of respective interim bill. For all such advances claimed/proposed, the Contractor shall sign an indemnity bond for each of such interim bills, in favour of the Employer, against any loss either due to theft or fire etc. The format shall be finalised in consultation with Architect/Engineer.

13. **SANITARY ACCOMMODATION IN SITE:**

The contractor shall provide and maintain at his own cost and expense adequate closet and sanitary accommodation for the use of his workmen and others in accordance with the rules and regulations of the relevant local authorities.

14. **FACILITIES TO OTHER CONTRACTORS:**

The contractor shall give full facilities and co-operation to all other contractors working at site doing plumbing, Electrical, civil works etc., as directed by the Architect & Employer and shall arrange his programme of work, so as not to hinder the progress of other works. The decision of the Architect & Employer, on any point of disputes between the various contractors, shall be final and binding on all parties concerned.

15. **TESTING:**

The contractor shall, as and when directed by the Architect & Employer, arrange to test materials and/or portions of the work at site in any approved laboratory at his own cost, in order to provide their soundness and efficiency. The contractor shall transport all the materials from site to the approved laboratory at his own cost. The contractor shall carryout all the mandatory tests as per list attached at the frequencies stated therein. Even after such tests, any materials brought to site or incorporated in the works are found to be defective or unsound or not as per approved samples, the contractor shall remove the same and re-erect at his own cost and without any additional time/period for the same, with reference to the date fixed for completing the work. In case these tests are not carried out at the frequencies stated, then proportionate costs of materials not so tested, including cost of testing and quantities of items of work executed with such materials, if otherwise accepted for retention in the work, will be deducted from the dues to

the contractor. The deductions will be worked out by the Architect/client and shall be final and binding on him.

Tolerance on various material and items of work shall be allowed laid down in the documents below and the order of precedence shall be:

- a) Relevant Indian Standards Specifications.
- b) CPWD norms.
- c) Manufacturer's Specifications.

In absence of above Architect's decision basing on the general practice being following shall be final.

16. **TESTING OF CONCRETE:**

The contractor shall make his own arrangements for testing of the concrete blocks at site or in any approved laboratory from time to time, as required by the Architects/ Employer and all the costs of testing and conveyance shall be borne by the Contractor. At least, six blocks of 150 x 150 x 150mm per 20 cum of RCC work or part thereof, for each day's work (subject to the condition that a minimum quantity of 0.5 cum of particular grade/type of concrete is laid on that day) must be taken in steel moulds as directed and tested. The Architect & Employer reserves the right to test the blocks at the cost of the contractor, in the event of the contractor failing to do so. It shall be contractor's sole responsibility to ensure that the blocks are cast, got tested from specifically approved laboratory/test house etc., in time and results reach the Architect, well before measurements for the corresponding work are to be recorded. For any failure in this regard, shall result in rejection of corresponding work(for which the blocks were not cast and or tested in time) and such work shall be dismantled fully alongwith linked up works and redone to required specifications/quality etc., EXCLUSIVELY at contractor's cost. Without any addition time beyond the stipulated/extended time for completion, as the case may be. Application of clauses 15 above in such cases shall EXCLUSIVELY rest within the discretion of the Architect.

17. **SITE MEETINGS:**

A senior representative of the contractor shall attend weekly meetings at works site; and in additions, meetings as and when arranged by Employer to discuss the progress of the work and sort out problems, if any, and ensure that the work is completed in the stipulated time.

18. **CUSTODY AND SECURITY OF MATERIALS:**

The contractor shall be responsible for the custody and security of all materials and equipment at site and he will provide full time watchman/watchmen to look after his materials, stores, equipments etc., including cement and steel at site and ensure that at no time unauthorised persons gains any access at works site.

19. **CEMENT:**

Cement shall be procured by the Contractor from the authorised dealers only, after getting the make and quality approved by the Employer and Architect. The brands shall be L&T/RAASI/KCP/ACC/RAJASHREE or any other manufacturer as approved by Architect and the Employer. The contractor should purchase the cement in adequate quantity, quite in advance, in order to have sufficient stocks (not less than the requirement of next fortnight) at site all the time. He will construct cement storage shed of adequate capacity with water tight walls, floor, roof and secure locking arrangements and locking as required and directed. Empty bags will be contractor's property. Contractor's Site Engineer shall maintain cement account at site, showing cement received with details of invoices, etc., quantity used daily (with brief details of items/location of works on which used), and progressive consumption and balance at site. This register will be checked periodically by Architect & Employer representative. Actual cement consumption will be periodically checked with the theoretical cement consumption. 75% secured advance will be paid to the contractor in his corresponding interim bills, for the cement laying unused at site and in good condition. Damaged cement will not be allowed to be used in work. Transportation of cement, within the site, will be carried out by the contractor, as and when required, at not extra cost. The secured advance paid in any bill will be fully recovered in the next bill.

20. **STEEL:**

Steel shall be procured by the contractor from SAIL/TISCO/VSP or any other manufacturer as approved by Architect. The contractor shall produce necessary vouchers in support of the purchases and also test certificates, for conforming the quality. All wastages, rolling margins, site to site transportation shall be borne by the contractor. Contractor shall maintain at site, steel account showing – steel received at site (consignment wise and section wise) and steel used (section wise) for work corresponding to each of the bills, etc., which shall be subject to checking by client/Architect 75% of the value of the steel physically available at site in good condition and quantities limited to actual requirements of next 30 days (reckoned from date of corresponding bill) plus 10% for wastage and variation will be paid. This exercise is to be section-wise. Theoretical quantity of consumption of steel shall be actual quantities measured plus 10% towards wastages and variations (rolling margins) and on this basis, balance quantities at site may be provisionally arrived at. All scrap steel at site and unused steel at site

to the extent not required on the work shall be contractor's property and contractor will be allowed to take it away after measurements/weight, and after getting necessary permission in writing from the Architect & Employer. In case of any discrepancy between the actual quantity of steel lying at site and the balance quantity as per record, the decision of the Architect/client shall be final and binding. The secured advance paid in any bill will be fully recovered in the next bill.

22. **TREASURE TROVE:**

Should any treasure, fossils, minerals, or works or art of antiquation interest be found during excavation or while carrying out the works, the same shall be the property of the Employer. The Contractor shall give immediate notice to the Architect & Employer about finding of any such treasure and hand over the same on demand to the Employer.

23. **NOTICES:**

The contractor shall give all notices and pay all necessary and relevant fees and shall comply with all Acts and Regulations, for the successful completion of the contract work.

Please refer clause 8 of General Conditions of Contract.

24. **STATUTORY REGULATIONS:**

The whole of the work including sanitation and electrical is to be complied with, as per the requirements and bylaws of the relevant statutory authorities, including Contract Labour (Regulation and Abolition) Act, 1970.

25. **MEASUREMENT TO BE RECORDED BEFORE WORK IS COVERED UP:**

The contractor shall take joint measurements with the Employer's representative (Project Management or any Engineer identified by the Employer) before covering up or otherwise placing beyond the reach of measurement any item of work. Should the contractor neglect to do so, the same shall be uncovered at the contractor's expense or in default thereof, no payment or allowance shall be made for such work or the materials with which the same was executed.

Refer clause 20 of General Conditions of Contract.

26. **WORKING AT NIGHT OR ON HOLIDAYS:**

The contractor can carry out major work at night, only with prior permission of the Site Engineer of Employer/Architect and with proper supervision. However, all concrete work will however, be carried out only during the day light.

WORKS AT NIGHT:

If the contractor is required to do preliminary works at night, in order to complete the work within the Time Schedule, the contractor shall provide and maintain at his own cost necessary and sufficient barricades/lights etc., to enable the work to proceed satisfactorily without danger. Approaches to the site also shall be sufficiently lighted by the contractor.

27. **WORKING ON HOLIDAYS:**

No work shall be done on Sunday or other Bank holidays that may be notified by the Architect & Employer, without the specific sanction in writing of the Architect & employer or his representatives.

28. **ACTION WHERE THERE IS NO SPECIFICATION:**

In case of any item/class of work, for which there is no specification mentioned (either in part or full), the same will be carried out in accordance with the relevant CPWD specifications (only for the specifications missing in the contract) and if not available even there (either in part or full) in, relevant standards of BIS shall be followed (only for the portions of specifications missing in the contract specifications and CPWD specifications). Indian standard specifications, subject to the approval of the Architect & Employer.

29. **REPORTING OF ACCIDENT TO:**

The contractor shall be responsible for the safety of all persons employed by him on the works and shall report serious accidents to any of them, whenever and wherever occurring one the works, to Employer who shall make every arrangement to render all possible assistance. This shall be without prejudice to the responsibility of the Contractor, under the Insurance clause of the General Conditions. Contractor shall take all the precautions as detailed in the safety code attached separately.

30. **CLEARING THE SITE ON COMPLETION/DETERMINATION OF WORKS:**

The contractor shall clear the site of works as per the instructions of the Architect. The site of works shall be cleared of all men, materials, sheds, huts etc., belonging to the contractor. The site shall be delivered in a clean and neat condition, as

required by Architect, within a period one week after the job is completed. In case of failure by the contractor, the Employer, under advice to the Architect, have the right to get the site cleared to his satisfaction at the risk and cost of the contractor.

31. **POSSESSION OF BUILDINGS/WORK COMPLETED:**

The contractor shall hand over to the Employer possession of the completed works in stages, as and when required, and as directed by the Architect & Employer.

The Employer will take over the possession of completed works in stages as directed by the Architect, and defects liability period will commence only from the date of final handing over of all the work accordingly.

Please refer Appendix to General Conditions of contract.

32. **TYPOGRAPHIC, CLERICAL AND OTHER ERRORS:**

The Architects/Employer's clarification regarding partially omitted particulars or typographical, clerical and other errors shall be final and binding on the contractors.

33. **INFORMATION TO BE SUPPLIED BY THE CONTRACTOR:**

The contractor shall furnish to the architect & Employer the following from time to time:

- a. Detailed industrial statistics regarding the labour employed by him, etc., every month (within 5th of succeeding month),
- b. The Power of Attorney, name and signature of his authorised representative, who will be in charge for the execution of work.
- c. The list of technically qualified persons (to be approved by the Architect) employed by him for the execution of the work within 15 days from date of start of work,
- d. The total quantity and quality of materials used for the works, every month within 5th of succeeding month.

- e. The list of plant and machinery employed for this work, every month. Copy of log books shall also be submitted every month (within 5th of succeeding month).

Last para of clause 33:

Failure to submit any of these details in time, shall be treated as a breach of the contract and likely to result in,

- i) Levying a fine of Rs.500 for each default for each month, and or
- ii) Withholding payments, otherwise due.
- iii) For the periods for which name of technically qualified persons are not given or for which such persons are not employed, recoveries shall be made at Rs.7,500/- per month for each month of default.

In all these matters the decision of the Architect shall be final and binding.

See clause 41 also.

34. **BENCH MARKS:**

The contractor shall construct and maintain proper benches at different places at site as required and directed by the Architect, so that levels can be checked accurately at all times during the progress of work. In case benches are disturbed for any reason whatsoever, necessary rectification shall be carried out by the contractor at his cost as directed by the Architect & Employer.

35. **FORE MAJEURE :**

Neither party shall be held responsible by the other for breach of any condition of this Agreement, attributable to any "Act of God", Act of State, Strike, lock-out or control or any other reason, beyond the control of the parties and any breach of clauses arising from such Fore Majeure conditions as aforesaid shall not be regarded as breach of the provisions of this Agreement.

36. **ARCHITECT'S DRAWINGS AND INSTRUCTIONS:**

A set of major drawings, along with the contract documents shall be provided to the contractor. If any clarification or further drawings are required by the Contractor during or before the start of construction work, the contractor shall inform the Architects and the Employer sufficiently in advance in writing to provide the same. Working details will be given to the Contractor from time to time, during the progress of work, as and when required. In case, any other

drawing/detail is required by the contractor, he will give a minimum of fifteen days notice to the Architect.

Refer clause 2 & 3 of General conditions of contract.

37. **COMPLETION OF WORK AND LIQUIDATED DAMAGES:**

The work shall be completed in 6 months, and reckoned as under:

(a) The day two weeks from the date of issue of work order.

or

(b) The day on which the contractor receives the possession of the site – whichever is later.

or

(c) The contractor is asked in writing to take over the possession of the site.

Time is the essence of the Contract. The Contractor shall strictly adhere to the programme/chart agreed to. In case the contractor fails to complete the work as mentioned above, the liquidated damages may be imposed at the rate of 0.5% per each week (or part thereof) of delay, subject to a maximum of 5% of contract amount.

Refer clause 30 & 31 of General Conditions of contract.

38. **BILLS OF PAYMENTS:**

The minimum value of work for interim payments will be Rs._____ lakhs, as stated in Appendix on Page 10. The contractor shall submit interim bills, once a month on the basis of joint measurements recorded at site by the contractor's Employer's and the Architects representatives. The bill will be certified by the Architect within 15 days from the date of submission of the bill by the contractor, and the Employer will make payment as stated in the Appendix to General Conditions of Contract. All such interim payments shall not be considered as an admission of the due performance of the contract or any part thereof in any respect and shall not preclude the requiring of bad unsound and imperfect or unskilled work to be removed and taken away and reconstructed or re-erected at contractor's cost, all as per Employer and Architect's instruction and directions.

39. **WORKMANSHIP:**

Quality of materials and workmanship shall conform strictly to specifications given/stipulated in the tender/contract, and contractor will ensure that the best

quality of work will be done to the satisfaction of the Architect and Employer, with strict control on the materials, workmanship and supervision.

Refer clause 9 of General Conditions of Contract.

40. **SCHEDULE OF QUANTITIES:**

Quantities mentioned in the Schedule of Quantities, included in the contract, are approximate and are subjected to variations as per actual site conditions & requirements and as directed by the Architect & Employer. The work shall be executed and completed accordingly.

Refer clause 4, 5 and 6 of General Conditions of Contract.

41. **SITE SUPERVISION:**

The contractor shall appoint at his own cost competent and adequate number of qualified Engineers at site, for (1a) joint measurements and preparations of bills. (2b) for testing materials at site and outside laboratory. (c) for concreting and reinforcement work. (d) for other general supervision. Their appointment shall be approved by the Architect & Employer. The site engineers shall not be removed from the site without the written consent of the Architect & Employer.

See clause 33 above also.

42. **ENGAGEMENT OF APPRENTICES:**

The Contractor shall during the currency of the contract, when called upon by the clients, engage and also ensure engagement by sub-contractors and others employed by the contractor in connection with the works such number of apprentices in the categories mentioned in the act and for such period as may be required by the clients. The contractor shall train them as required under the Apprentice Act 1961 and the Rules made thereunder and shall be responsible for all obligations of the clients under the said Act, including the liability to make payment of apprentices, as required under the said Act.

43. **RATES:**

Contractor shall quote all the rates both in figures and in words and any alterations shall have to be initialled by the contractor. Rates quoted by the contractor for the same item in different schedules shall be same, and incase different rates are quoted, the lowest will be taken as correct and the schedule corrected accordingly. In case of discrepancy between rates given in words and figures or in the amount worked out, the following procedure will be followed:

- (a) When there is difference between the rates in figures and in words, the rates which correspond to the amounts worked out will be taken as correct.
- (b) When the amount of an item is not worked out by the contractor or does not correspond with the rate written either in figures or in words, then the rate quoted in words will be taken as correct.
- (c) When the rate quoted by the contractor in figures and words tallies but the amount is not worked out correctly, the rate quoted will be taken as correct and not the amount.

Rates quoted by the contractor shall hold good for all the work carried out upto any height and depth, as shown in detailed drawings and laid down in bill of quantities and or as required and directed by the Architect.

Rates quoted by the contractor shall also hold good for any small works at any place at site.

Minor repairs and works to other existing buildings and services shall also be carried out by the contractor at rates quoted in the tender.

The rates quoted for all items of work shall include all the items of work covered by the specifications for the corresponding item of work, unless otherwise specifically mentioned to the contrary (NOT IMPLIED) elsewhere.

44. **INCOME TAX AND WORKS CONTRACT TAX:**

Income tax and works contract tax shall be deducted at source by the client from the contractor's interim and final bill payments as required by law.

45. **EXTRA/SUBSTITUTED ITEM RATES:**

Such items shall be executed as per directions/instructions of the Architects of the employer.

The work on extra/substituted items shall be started only after the receipt of written order from the client/Architect. Rates for additional/extra or substituted (altered) items of work, which are not covered in the contract cannot be derived from the contract item rates either in full or partly, shall be calculated on the basis of actual costs plus 15% for overhead and profit etc., only to the extent not derivable from the contract item rates.

See clause 21 of General Conditions of Contract.

46. **SERVICES DRAWINGS/SHOP DRAWINGS/CATALOGUE:**

After getting approval from the Architect & Employer, the contractor shall submit to the concerned local authorities necessary services drawings showing layouts etc., for getting approval of the schemes. On completion, the contractor shall arrange to get Drainage Completion Certificate and other Certificate necessary for obtaining Building Completion certificate. The contractor shall furnish completion drawings of all services in triplicate, showing the work as actual executed, along with levels. Contractor shall submit for approval 4 copies of shop drawings/ catalogue/ equipment characteristics/ manufacturer's specifications, drawings etc., as and when required and directed by the Architect & Employer. Costs of all these are deemed to have been included in the respective item rates quoted by the contractor and nothing extra shall be paid on account of any of these requirement/acts.

47. **PAYMENT:**

No payment whatsoever shall be made by the Employer, if the Contractor abandons the work, due to any site difficulties etc.,

See clause 36 & 37 of General conditions of contract.

48. **PERMISSION:**

The contractor shall also obtain necessary permission for using explosive (if required and specifically permitted by the Architect and Employer in writing), as per rules and regulations of relevant authorities, and all other approvals from the relevant authorities shall be obtained by the contractor at no extra cost.

49. **MAINTAINING REGISTERS AT SITE:**

The contractor shall maintain registers for consumption of various specials, testing of materials etc., in the proforma which shall be given by the Architect & Employer from time to time.

50. **AGREEMENT:**

The successful contractor shall be required to enter into an agreement in accordance with the Draft Agreement and Schedule of Conditions etc., within 15 days from the date the contractor is advised by the Architect & Employer that his tender has been accepted. The contractor shall pay for all stamps and legal expenses incidental thereto. However, the written acceptance of the tender by the Employer, will constitute as a binding contract between the Employer and contractor, whose tender has been accepted, whether such formal agreement is or is not subsequently executed.

51. **INSURANCE:**

The contractor shall provide insurance in respect of damage to persons and property and firm insurance as per clause 27 and 28 of General conditions of contract. In addition he will also insure against riots and civil commotion. The insurance shall also cover third party and all the persons working at site and visitors including contractor's, worker's, Architect's and clients people, other contractor's workers etc. The contractor shall indemnify the Employer against any claim or compensation or mishaps of whatsoever nature at site during the progress of work.

The contractor shall prove to the Architect/Client from time to time that he has taken out all the insurance policies as required and directed and has paid the necessary premium for keeping the policies valid as per clause 27 & 28 of the General Conditions of Contract.

In case of failure by the Contractor or sub-contractor to effect and keep in force the insurance policies, then the client, without being bound to, may pay such premiums as may be necessary and deduct the same from any money due or which may become due to the contractor or recover the same as a debt due from the contractor.

52. **INDEBTEDNESS AND LIENS:**

The contractor agrees to furnish the Employer from time to time, during the progress of the work as requested, verified statement showing the contractor's total outstanding indebtedness in connection with the work covered by the contract. Before final payment is made, the Employer may require the contractor to furnish the Employer with satisfactory proof that there are no outstanding debts or liens in connection with the contract. If during the progress of the work, the contractor shall allow any indebtedness to accrue to sub-contractor or other and shall fail to pay or discharge same with five (5) days after demand, then the Employer may withhold any money due to the contractor until such indebtedness is paid, or apply the same towards the discharge thereof.

53. **WORK PERFORMED AT CONTRACTOR'S RISK:**

The contractor shall take all precautions necessary and shall be responsible for the safety of the work and shall maintain all lights, guards, signs, barricades, temporary passages or other protection necessary for the purpose. All work shall be done at the contractor's risk and if any loss or damage shall result from fire or from any other cause, the contractor shall promptly repair or replace such loss or damage free from all expenses to the Employer. The Contractor shall be responsible for any loss or damage to materials, tools or other articles used or held for use in connection with the work. The work shall be carried on to Employer or

of others and without interference with the operation of existing machinery or equipment, if any.

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56. **SPECIAL CONDITIONS OF CONTRACT:**

In the event of any discrepancy with clauses mentioned anywhere else in the tender with the clauses mentioned within special conditions of contract, the clauses mentioned within the special conditions of contract shall supersede there mentioned elsewhere.

TECHNICAL SPECIFICATIONS

II. I. EXTERNAL WATER SUPPLY:

1. MATERIALS:

a. Ferrules:

The ferrules for connection with C.I. main shall generally conform to IS:2692 – 1964. It shall be of non-ferrous materials with a C.I. bell mouth cover and shall be of nominal bore as specified. The ferrule shall be fitted with a screw and plug or valve capable of completely shutting off the water supply to the communication pipe, if and when required.

b. Fire Hydrants:

The Hydrants shall be of spindle type with 65mm outlet combined with sluice valve, unless otherwise specified. The hydrant shall conform to IS:909 – 1975 and shall consist of the following components:-

- i. One sluice valve Class I type, conforming to IS: 780-1969,
- ii. A duck foot bend,
- iii. A 65mm male coupling instantaneous pattern; and
- iv. Cast iron cap permanently secured to the duck foot bend by means of a chain. Where the fire service requirement of coupling differs from the above, the requisite coupling shall be provided at no extra cost.

The body and cover shall be of good quality cast iron, spindle of bronze and the nut and the valve seat of leaded tin bronze. The bodies, spindle and other parts shall be truly machined with surface smoothly finished.

c. Full way valve Brass:

Full way valve is a valve with suitable means of connection for insertion in a pipe line for controlling or stopping the flow. The valve shall be of

brass fitted with a cast iron wheel and shall be of gate valve type conforming to IS:780 – 1969, opening full way and of the size as specified.

The valves shall be of best quality as approved by the Engineer-in-charge and shall approximately have the weights specified in table given below with a tolerance of 5 percent.

Diameter (mm)	Flanged ends (Kg)	Screwed ends (Kg)
15	1.021	0.567
20	1.503	0.680
25	2.495	1.077
32	3.232	1.559
40	4.082	2.268
50	6.691	3.232
65	10.149	6.804
80	13.381	8.845

d. Full way Valve with wheel – Gun-metal:

These shall be of the gun metal fitted with wheel and shall be of gate valve type opening full way and of the size as specified. These shall generally conform to IS:778 – 1971 and their weights shall be as specified in Table shown above.

e. Lead Pig:

Pig lead shall be of uniform quality, clean and free from foreign materials. It shall be of uniform softness and capable of being easily caulked or driven. It shall conform to IS 782 – 1966 for caulking lead in all respects.

f. Non-return valve or check valve – Brass:

A non – return valve permits water to flow in one direction only and is provided on the ascending part of the main to check return flow. The non-return valve shall be of brass and shall be of horizontal or vertical flow type as specified.

The valve shall be of quality approved by the Engineer-in-charge and shall have the weights specified in table given below with a tolerance of 5 percent.

Diameter	Flanged ends	Screwed ends
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(mm)	(Kg)	(Kg)
15	0.30	0.25
20	0.55	0.25
25	0.90	0.75

Diameter (mm)	Flanged ends (Kg)	Screwed ends (Kg)
32	1.25	0.90
40	1.70	1.20
50	2.90	1.45
65	5.25	2.15
80	7.70	4.10

g. Non return Valve or check valve – Gun Metal:

Specification described in 1(f) shall apply except that non-return valve shall be of gun metal and shall generally confirm to IS:778 – 1971.

h. Pipes – Cast Iron Centrifugally Cast (Spun):

The spun iron pipes shall conform to IS 1536 – 1976. The spun iron pipes shall be of cast iron casted centrifugally and vary in diameters from 80mm to 750mm. These shall be of class LA, Class A and Class B, as specified. These pipes shall be used for water pressures upto half the hydraulic test pressures as detailed in table given below:

Types of pipes	<u>Test Pressure in Kg/cm²</u>		
	Class LA	Class A	Class B
Spigot and socket pipe in all diameters.	12	18	24
Flanged pipes upto 600mm dia	..	18	24

Specials:

The specials shall conform to IS:1538 – 1976. The hydraulic test pressure of each class shall be detailed in table given below:

Nominal Diameter	Test pressure in Kg/cm ² (metre head)	
	Fitting without branches or with branches not greater than half the principal diameter	Fitting with branches greater than half the principal diameter
Upto and including 300mm	25(250)	25(250)
Over 300mm and upto and including 600mm	15(150)	10(100)
Over 600mm and upto and including 1500mm	15(150)	10(100)

i. Pipes – Cast Iron (Vertically Cast):

The pipes shall conform to IS:1537 – 1976. The pipes shall be either with spigot and socket ends or flanged ends. The pipes shall be of cast iron casted vertically and vary in diameter from 80mm to 1500mm. These shall be of either class A or class B as specified. These pipes shall be used for water pressure upto half of the hydraulic test pressure of various pipes as detailed in Table given below:

Nominal Diameter	Test pressure in Kg/Cm ² (metre head)			
	Socket & spigot pipes		Flanged pipes	
	Class A	Class B	Class A	Class B
Upto and including 300mm.	20(200)	25(250)	20(200)	25(250)
Over 300mm to 600mm.	20(200)	25(250)	15(150)	20(200)
Over 600mm to 1000mm.	15(150)	20(200)	10(100)	15(150)
Over 1000mm to 1500mm.	10(100)	15(150)	10(100)	10(100)

j. Pipes – Galvanised Iron:

The pipes (tubes) shall be galvanised mild steel hot finished seamless (HFS) or welded (ERW) HRIW or HFW screwed and socketed conforming to the requirements of IS: 1239 – 1973 Part I for medium

grade. They shall be of the diameter (nominal bore) specified in the description of the item. The sockets shall be designated by the respective nominal bores of the pipes for which they are intended.

- i. Galvanising shall conform to IS: 4376 – 1968. The zinc coating shall be uniform, adherant, reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumpings, runs, rust stains, bulky white deposits and blisters. The pipes and sockets shall be cleanly finished, well galvanised in and out and free from cracks, surface flaws laminations and other defects. All screw threads shall be clean and well cut. The ends shall be cut cleanly, and square with the axis of the tube.
- i. The details of pipes and sockets shall be as prescribed in Appendix D.
- ii. All screwed tubes and sockets shall have pipe threads conforming to the requirements of IS:554-1964. Screwed tubes shall have taper threads while the sockets shall have parallel threads.
- iii. All tubes shall withstand a test pressure of 50 Kg/cm² without showing defects of any kind.
- iv. **Fittings:**

The fittings shall be of mild steel tubular or wrought steel fittings conforming to IS:1239 (Part II) – 1968 or as specified. The fittings shall be designated by the respective nominal bores of the pipes for which they are intended.

k. Sluice Valves – Brass/Gun Metal:

The sluice valves are used in a pipe line for controlling or stopping flow of water. These shall be of specified size and class and shall be of inside non-raising screw type upto 300mm size and raising or non-raising screw type above 300 mm with either double flange or double socket ends and cap of hand-wheel. These shall in all respects comply with the Indian Standard Specification IS:780-1969 for valves upto and including 300mm size and IS:2906-1969 for valves above 300mm size. Class I sluice valves are used for maximum working pressure of 10 Kg/cm² (100 metre head) and class II sluice valve for 15 Kg/cm² (150 metre head).

The body, domes, covers, wedge gate and stuffing box shall be of good quality cast iron, the spindle of bronze, the nut and valve seats of leaded tin bronze. The bodies, spindles and other parts shall be truly machined with surfaces smoothly finished. The area of the water way of the fittings shall be not less than the area equal to the nominal bore of the pipe.

2. **LAYING AND JOINTING OF PIPES AND FITTINGS:**

a. Unloading:

- i. The pipe shall be unloaded where they are required.
- ii. Unloading (except where mechanical handling facilities are available) – pipes weighing upto 60 Kg shall be handled by two persons by hand-passing. Heavier pipes shall be unloaded from the lorry or wagon by holding them in loops, formed with ropes and sliding over planks set not steeper than 45°. The planks shall be sufficiently rigid and two ropes shall always be used to roll the pipes down the planks. The ropes should be tied on the side opposite the unloading. Only one pipe shall be unloaded at a time.
- iii. Under no circumstances shall be the pipes be thrown down from the carriers or be dragged or rolled along hard surfaces.
- iv. The pipes shall be checked for any visible damage (such as broken edges, cracking or spalling of pipe) while unloading and shall be sorted out for reclamation. Any pipe which shows sufficient damage to preclude it from being used shall be discarded.

b. Storing:

- i. The pipes and specials shall be handled with sufficient care to avoid damage to them. These shall be lined up on one side of the alignment of the trench, socket facing upgrade when line runs uphill and upstream when line runs on level ground.
- ii. Each stack shall contain pipes of same class and size. Consignment or batch number and particulars of suppliers, wherever possible, shall be marked on the stack.
- iii. Storing shall be done on firm, level and clean ground. Wedges shall be provided at the bottom layer to keep the stack stable.

c. Cutting:

- i. Cutting of pipes may be necessary when pipes are to be laid in lengths shorter than the lengths supplied, such as while replacing accessories like tees, bends, etc., at fixed positions in the pipe lines.

- ii. A line shall be marked around the pipe with a chalk piece at the point where it is to be cut. The line shall be so marked that the cut is truly at right angle to the longitudinal axis of the pipe. The pipe shall be rigidly held on two parallel rafters nailed to cross beams, taking care that the portion to be cut does not overhang and the cut mark is between the two rafters. The pipe shall be neatly cut at the chalk mark with carpenter's saw or hacksaw having a long blade, by slowly rotating the pipe around its longitudinal axis so as to have the uncut portion on top for cutting. Cutting of the pipe at the overhang should, as far as possible, be avoided, as an overhanging and is liable to tear off due to its weight before the cutting is complete.

d. Trenches:

- i. The trenches shall be so dug that the pipes may be laid to the required alignment and at required depth.
- ii. Cover shall be measured from top of pipe to the surface of the ground.
- iii. The bed of the trench, if in soft or made up earth, shall be well watered and rammed before laying the pipes and the depressions, if any, shall be properly filled with earth and consolidated in 20 cm layers.
- iv. If the trench bottom is extremely hard or rocky or loose stony soil, the trench shall be excavated at least 150mm below the trench grade. Rocks, stone or other hard substances from the bottom of the trench shall be removed and the trench brought back to the required grade by filling with selected fine earth or sand (or fine moorum if fine soil or sand is not available locally) and compacted so as to provide a smooth bedding for the pipe. Where excavation requires blasting operation, it shall be ensured that no pipes have been stacked in the vicinity and completed pipe line in the vicinity has already been covered before starting of blasting operations; this is necessary to prevent damage to the exposed pipes in the vicinity by falling stones as a result of blasting.
- v. After the excavation of the trench is completed, hollows shall be cut at the required position to receive the socket of the pipes and these hollows shall be of sufficient depth to ensure that the barrels of the pipes shall rest throughout their entire length on the solid ground and that sufficient spaces left for jointing the underside of the pipe joint. These socket holes shall be refilled with sand after jointing the pipe.
- vi. Roots of trees within distance of about 0.5 metre from the side of the pipe line shall be removed or killed.

- vii. The excavated materials shall not be placed within 1 metre or half of the depth of the trench, whichever is greater, from the edge of the trench. The materials excavated shall be separated and stacked so that in refilling they may be relaid and compacted in the same order to the satisfaction of the Engineer-in-charge.
- viii. The trench shall be kept free from water. Shoring and timbering shall be provided wherever required. Excavation below water table shall be done after dewatering the trenches.
- ix. Where the pipe line or drain crosses an existing road, the road crossing shall be excavated half at a time, the 2nd half being commenced after the pipes have been laid in the first half and the trench refilled. Necessary safety measures for traffic as directed shall be adopted. All types, water mains cables, etc., met within the course of excavation shall be carefully protected and supported. Care shall be taken not to disturb the electrical and communication cable met with during course of excavation, removal of which, if necessary, shall be arranged by the Engineer-in-Charge.

e. Laying:

- i. The pipes shall be lowered into the trench by means of suitable pulley blocks, sheer legs chains ropes etc. In no case the pipes shall be rolled and dropped into the trench. One end of each rope may be tied to a wooden or steel peg driven into the ground and the other end held by men which when slowly released will lower the pipe into the trench. After lowering, the pipes shall be arranged so that the spigot of one pipe is carefully centered into the socket of the next pipe, and pushed to the full distance that it can go. The pipe line shall be laid to the levels required. Specials shall also be laid in their proper position as stated above.
- ii. Where so directed, the pipes and specials may be laid on masonry or concrete pillars. The pipe laid on the level ground, shall be laid with socket facing the direction of flow of water.
- iii. The pipes shall rest continuously on the bottom of the trench. The pipes shall not rest on lumps of earth or on the joints. Four metre long wooden templates may be used to check the level of the bed. Clearance of approximately 10mm in depth and width equal to length of the collar plus 30mm on both sides shall be provided at the joint which shall be refilled from sides after the joint is made.
- iv. In unstable soils, such as soft soils and dry lumpy soils it shall be checked whether the soils can support the pipe lines and if required suitable special foundation shall be provided.
- v. Some clayey soils (for example black cotton soil) are drastically affected by extremes of saturation and dryness. In changing from saturated to a dry

condition, these soils are subjected to extraordinary shrinkage which is usually seen in the form of wide and deep cracks in the earth surface and may result in damages to underground structures, including pipe materials. The clay forms a tight gripping bond with the pipe, subjecting it to excessive stresses as the clay shrinks. It is recommended that in such cases an envelope of a minimum 100mm of tamped sand shall be made around the pipe line to avoid any bonding.

- vi. In places where rock is encountered, cushion of fine earth or sand shall be provided for a depth of 150mm by excavating extra depth of the trench, if necessary and the pipes laid over the cushion. Where the gradient of the bed slopes is more than 30° it may be necessary to anchor a few pipes against sliding downwards.

f. Thrust Blocks:

- i. Thrust blocks are required to transfer the resulting hydraulic thrust from the fitting or pipe on to a larger load bearing soil section.
- ii. Thrust blocks shall be installed wherever there is a change in the direction/size of the pipe line or the pressure line diagram, or when the pipe line ends at a dead end. If necessary, thrust blocks may be constructed at valves also.
- iii. Thrust blocks shall be constructed taking into account the pipe size, water pressure, type of fittings, gravity component shell when laid on slopes and the type of soil.
- iv. When a fitting is used to make a vertical bend, it shall be anchored to a concrete thrust block designed to have enough weight to resist the upward and outward thrust. Similarly at joints, deflected in vertical plan, it shall be ensured that the weight of the pipe, the water in the pipe and the weight of the soil over the pipe provide resistance to upward movement. If it is not enough, ballast or concrete shall be placed around the pipe in sufficient weight to counteract the thrust.
- v. When the line is under pressure there is an outward thrust at each coupling. Good soil, properly tamped is usually sufficient to hold pipe from side movement. However, if soft soil conditions are encountered, it may be necessary to provide side thrust blocks or other means of anchoring. In such cases only pipe on each side of the deflected coupling shall be anchored without restricting the coupling.
- vi. Pipes on slopes need be anchored only when there is a possibility of the back fill around the pipe sloping down the hill and carrying the pipe with it. Generally for slope upto 30° good well drained soil, carefully tamped

in layers of 100mm under and over the pipe, right upto the top of trench will not require anchoring.

- vii. For steeper slopes, one out of every three pipes shall be held by straps fastened to vertical supports anchored in concrete.

g. Back filling and Tamping:

- i. Back filling shall follow pipe installation as closely as possible to protect pipe from falling boulders, eliminating possibility of lifting of the pipe due to flooding of open trench and shifting pipe out of line by caved in soil
- ii. The soil under the pipe and coupling shall be solidly tamped to provide a firm and continuous support for the pipe line. Tamping shall be done either by tamping bars or by using water to consolidate the back fill materials.
- iii. The initial back fill material used shall be free of large stones and dry lumps. In stony areas the material for initial back fill can be shaved from the sides of the trenches. In bogs and marshes, the excavated material is usually little more than vegetable matter and this should not be used for bedding purposes. In such case, gravel or crushed stone shall be hauled in.
- iv. The initial back fill shall be placed evenly in a layer of about 100mm thick. This shall be properly consolidated and this shall be continued till there is a cushion of at least 300mm of cover over the pipe.
- v. If it is desired to observe the joint or coupling during the testing of mains they shall be left exposed. Sufficient backfill shall be placed on the pipe to resist the movement due to pressure while testing.
- vi. Balance of the back fill need not be so carefully selected as the initial material. However, care shall be taken to avoid back filling with large stones which might damage the pipe when spaded into the trench.
- vii. Pipes in trenches on a slope shall have extra attention to make certain that the newly placed back fill will not become a blind drain in effect because until back fill becomes completely consolidated there is a tendency for ground or surface water to move along this looser soil resulting in a loss of support to the pipe. In such cases, the back fill shall be tamped with extra care and tamping continued in 100mm layers right upto the ground level.

h. Hydrostatic tests:

- i. After a new pipe has been laid, jointed and back filled (or any valved sections thereof) it shall be subjected to the following two tests:

- Pressure test at a pressure of at least double the maximum working pressure pipe and joints shall be absolutely water tight under the test.
 - Leakage tests (to be conducted after the satisfactory completion of the pressure test) at a pressure to be specified by the authority for a duration of two hours.
- ii. The portions of the line shall be tested by subjecting to pressure test as the laying progresses before the entire line is completed. In this way any error of workmanship will be found immediately and can be corrected at a minimum cost. Usually the length of the section to be tested shall not exceed 500m.
 - iii. Where any section of a main is provided with concrete thrust blocks or anchorages, the pressure shall not be made until at least five days have elapsed after the concrete is cast. If rapid hardening cement has been used in these blocks or anchorages, the test shall not be made until at least two days have elapsed.
 - iv. Prior to testing, enough back fill as described in 2(f) shall be placed over the pipe line to resist upward thrust. All thrust blocks forming part of the finished line shall have been sufficiently cured and no temporary bracing shall be used.
 - v. The open end of the section shall be sealed temporarily with an end cap having an outlet which can serve as an air relief vent or for filling the line, as may be required. The blind face of the end cap shall be properly braced during testing by screw jacks and wooden planks or steel plate.
 - vi. The section of the line to be tested shall be filled with water manually or by a low pressure pump. Air shall be vented from all high spots in the pipe line before making the pressure strength test because entrapped air gets compressed and caused difficulty in raising the required pressure for the pressure strength test.
 - vii. The test pressure shall be gradually raised at the rate of approximately one Kg/cm²/min. The duration of the test period if not specified shall be sufficient to make a careful check on the pipe line section.
3. **LAYING AND JOINTING OF CAST IRON PIPES AND FITTINGS (EXTERNAL WORK):**
- a. **Trenches:**
 - i. The gradient is to be set out by means of bonning rods and the required depth to be excavated at any point of the trench shall be regarded as directed by the Engineer-in-charge. The depth of the trench shall not be

less than 1 metre measured from the top of the pipe to the surface of the ground under roads and not less than 0.75 metre elsewhere.

- ii. The *width* of the trench shall be the nominal diameter of the pipe plus 40 cm but it shall not be less than 55 cm in case of all kinds of soils excluding rock and not less than 1 metre in case of rock.

b. Laying:

Any deviation either in plan or elevation less than $1\frac{1}{4}^\circ$ shall be effected by laying the straight pipes round a flat curve of such radius that minimum thickness of lead at the face of the socket shall not be reduced below 6mm or the opening between spigot and socket increased beyond 12mm at any joint. A deviation of about $2\frac{1}{4}^\circ$ can be effected at each joint in this way. At the end of each day's work the last pipe laid shall have its open ends securely closed with a wooden plug to prevent entry of water, soil, rats and any other foreign matter into the pipe.

c. Lead Caulked joints with Pig Lead:

- i. This type of lead caulking is generally done in providing joints in gas water and sewer lines wherever it is practicable to use cast lead caulking, but not in case of wet conditions.
- ii. The approximate depth and weights of pig lead for various diameters of C.I. pipes and specials shall be as given in table below:

LEAD FOR DIFFERENT SIZES OF PIPES

Nominal size of pipe mm (1)	Lead/joint Kg. (2)	Depth of lead joint mm (3)
80	1.8	45
100	2.2	45
125	2.6	45
150	3.4	50
200	5.0	50
250	6.1	50
300	7.2	55
350	8.4	55
400	9.5	55
450	14.0	55
500	15.0	60
600	19.0	60
700	22.0	60
750	25.0	60

Note: The quantity of lead given in the table are provisional and a variation of 20 percent is permissible.

d. Flanged Joints:

- i. Cast iron pipes may be jointed by means of flanges cast on. The jointing material used between flanges of pipes shall be compressed fibre board or rubber of thickness between 1.5mm to 3mm. The fibre board shall be impregnated with chemically neutral mineral oil and shall have a smooth and hard surface. Its weight per m² shall be not less than 112g/mm thickness.
- ii. Each bolt should be tightened a little at a time taking care to tighten diametrically opposite bolts alternatively. The practice of fully tightening the bolts one after another is highly undesirable.
- iii. Several proprietary flexible joints are available for jointing cast iron pipes and these may be used with the specific approval of the authority, however, they shall be used strictly in accordance with the manufacturer's instructions.
- iv. For joints in small diameter cast iron piping, copper-alloy screwed unions or ferrules shall be used, and for large dia. The joints shall be made by flanged connecting pieces.

e. Hydrostatic Tests:

The procedure for testing shall be as described in "Procedure for Pressure Test".

f. Measurements:

- i. The net length of pipes as laid or fixed, shall be measured in the running metres correct to a cm. The portion of the pipe within the collar at the joints of water meters, shall, however, not be included in the length of pipe work.
- ii. Excavation, refilling, shoring and timbering in trenches masonry or concrete pillars and thrust blocks, wherever required, shall be measured separately, under relevant items of work.

g. Rate:

The rate shall include the cost of materials and labour involved in all the operations described above.

1. **MAKING CONNECTION OF G.I.DISTRIBUTION BRANCH WITH G.I. MAIN:**

a. **Preliminary Work:**

A pit of suitable dimensions shall be dug at the point where the connection is to be made with the main and earth removed upto 15 cm below the main. The flow of water in the water main shall also be disconnected by closing the sluice or wheel valves on the mains.

b. **Making Connection:**

The GI main main shall first be cut. Water if any collected in the pit shall be bailed out and ends of the G.I.pipes threaded. The connection of distribution pipe shall then be made by fixing malleable G.I. tee of the required size and fittings such as jam nut, G.I.socket connecting piece etc.

c. **Testing of joints:**

After laying and jointing, the pipes and fittings shall be inspected under working condition of pressure and flow. Any joint found leaking shall be redone and all leaking pipes removed and replaced without extra cost.

The pipes and fittings after they are laid shall be tested to hydraulic pressure of 6 Kg/cm (60 metre). The pipes shall be slowly and carefully charged with water allowing all air to escape and avoiding all shock or water hammer. The draw of taps and stop cocks shall then be closed and specified hydraulic pressure shall be applied gradually. Pressure gauge must be accurate and preferably should have been recalibrated before the test. The test pump having been stopped, the test pressure should be maintained without loss for at least half an hour. The pipes and fittings shall be tested in sections as the work of laying proceeds, having the joints exposed for inspection during the testing.

d. **Rate:**

The rate shall include the cost of labour and materials involved in all the operations described above.

2. **FIXING FERRULES:**

For fixing ferrule the empty main shall be drilled and tapped at 45°C to the vertical and the ferrule screwed in. The ferrule must be so fitted that no portion of the shank shall be left projecting within the main into which it is fitted.

3. **INSTALLATION OF FIRE HYDRANT:**

The hydrant shall be fully examined and cleared of all foreign matter before being fixed. The fixing shall be done on the water main which shall be of minimum 80mm dia. The flanged end of the hydrant shall be fixed to the flanged outlet of a tee in the water main by means of bolts, nuts and 3mm rubber insertion or chemically treated compressed fibre board 1.5mm minimum thickness and of weight not less than 0.183 gm per sq.cm. This can also be fixed by means of flanged tail piece which may be connected to the water main by C.I.specials.

4. **INSTALLATION OF SLUICE VALVE:**

a. The valve shall be fully examined and cleared of all foreign matter before being fixed. The fixing of the valve shall be done by means of bolts, nuts and 3mm rubber insertions or chemically treated compressed fibre board 1.5mm minimum thickness and of weight not less than 0.183 gm/Sq.cm with the flanges of spigot and the socketed tail pieces drilled to the same specification in case of S & S pipes and with flanges in case of flanged pipes. The tail pieces shall conform to IS:1938 – 1976. These shall be jointed to the pipe line by means of lead caulked joints.

b. **Measurements:**

Sluice valve shall be enumerated.

c. **Rate:**

The rate shall include the cost of material and labour involved in all the operations described above.

APPENDIX A

TOLERANCE FOR CAST IRON (CENTRIFUGALLY CAST) PIPES

Tolerance on Diameter:

	Dimensions	Nominal Diameter (DN)	Tolerance in mm
a)	External diameter of barrel (DE)	All diameters	$\pm 1/2 F = \pm (4.5 + 0.0015 DN)$
b)	Internal diameter of Socket (DI)	All diameters	$\pm 1/2 F = \pm (3 \pm 0.001 DN)$
c)	Depth of socket (P)	(1) Upto and including 600mm (2) Over 600mm and upto end including 1000 mm	± 5 ± 10

- Note:** 1. F is the caulking space of the joint in millimeters and is equal to $9 + 0.003 DN$.
2. The jointing tolerance applicable to rubber joints (mechanical or push in joints) shall be as specified by their manufacturer and shall be within the tolerances specified above.

Tolerance on thickness:

	Dimensions	Tolerance in mm
(a)	Wall thickness	$-(1 + 0.05 e)$
(b)	Flange thickness	$\pm (2 + 0.05 b)$

Where e is the thickness of the wall in millimeters and b is the thickness of the flange in millimeters.

Tolerance on Length:

	Dimensions	Tolerance in mm
(a)	Socket and spigot, and plain ended pipes	± 24
(b)	Flanged pipes	± 10

APPENDIX B

TOLERANCES FOR SPECIALS OF CAST IRON PIPES

Tolerance in Diameter:

Dimension	Nature of joint	Nominal diameter (DN)	Tolerance in mm
External diameter of spigot (DE)	Lead joints	All Diameters	$\pm 1/2 F$ or $\pm (4.5 + 0.0015 DN)$
Internal diameter of spigot (DI)	Lead joints	All Diameters	$\pm 1/3 F$ or $\pm (3 + 0.001 DN)$
Depth of socket (P)	Lead joints	Upto and including 600mm	± 5
		Over 600mm upto and including 1000mm	± 10
		Over 1000mm upto and including 1500mm	± 15

Tolerances on Thickness:

Dimension	Tolerance in mm
Wall thickness	$-(2 + 0.05 e)$
Flange Thickness	$\pm (3 + 0.05 b)$

Where e = the standard thickness of the wall in millimeters, and
 b = the standard thickness of the flange in millimeters

Tolerances on lengths:

Type of Fitting	Nominal Diameter	Tolerance in mm
Socket fittings and flange and Spigot pieces.	Upto and including 450mm	± 20
	Over 450mm	± 20 $- 30$
Flanged fittings	All diameters	± 10

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APPENDIX C

TOLERANCE FOR CAST IRON (VERTICALLY CAST)

Tolerance on Diameter:

	Dimensions	Nominal Diameter (DN)	Tolerance in mm
1.	External diameter of barrel (DE)	All diameters	+ 1/3 F - 1/2 F
2.	Internal diameter of Socket (DI)	All diameters	+ 1/3 F - 1/4 F
3.	Depth of socket (P)	Upto and including 600mm Over 600 to 1000 mm Over 1000 to 1500mm	± 5 ± 10 ± 15

Where $D = 9 + 0.003$, DN = Caulking space of joint in mm.

Tolerance on thickness:

	Dimensions	Tolerance in mm
(a)	Wall thickness	- (1 + 0.05 c) + no limit
(b)	Flange thickness	$\pm (2 + 0.05 b)$

Where c is the thickness of the wall in millimeters and
b is the thickness of the flange in millimeters.

Tolerance on Length:

	Type of casting	Tolerance in mm
(a)	Socket and spigot, and plain ended pipes Vertically cast.	± 20
(b)	Flanged pipes	± 10

APPENDIX D

PARTICULARS OF MEDIUM GRADE G.I. PIPES

Nominal Bore	Dimension of pipes		Thickness	Weight of Pipe	
	Out side diameter			Plain end	Screwed & socket
	Maximum	Minimum			
mm	mm	mm	mm	Kg/m	Kg/m
6	10.60	9.80	2.00	0.407	0.410
8	14.00	13.20	2.35	0.650	0.654
10	17.50	16.70	2.35	0.852	0.858
15	21.80	21.00	2.65	1.220	1.230
20	27.30	26.50	2.65	1.580	1.590
25	34.20	33.30	3.25	2.440	2.460
32	42.90	42.00	3.25	3.140	3.170
40	48.80	47.90	3.25	3.610	3.650
50	60.80	59.70	3.65	5.100	5.170
65	76.60	75.30	3.65	6.510	6.630
80	89.90	88.00	4.05	8.470	8.640
100	115.00	113.10	4.50	12.100	12.40
125	140.80	138.50	4.85	16.200	16.70
150	166.50	163.90	4.85	19.200	19.80

Tolerances on thickness and weight:

(a) **Thickness:**

- | | | |
|----|--------------------------|---------------------------------|
| 1. | Butt welded Medium tubes | + not limited
- 10 percent |
| 2. | Seamless tubes | + not limited
- 12.5 percent |

(b) **Weight:**

- | | | |
|----|--|-----------------------------|
| 1. | Single tube (irrespective of quantity) | + 10 percent
- 8 percent |
| 2. | For quantities of less than 150m of one size | + 10 percent
- 8 percent |
| 3. | For quantities of 150m and over of one size | ± 4 percent |

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APPENDIX F

PROCEDURE FOR PRESSURE TEST

1. Each valved section of the pipe shall be slowly filled with water and all air shall be expelled from the pipe through hydrants and blowoffs. If these are not available at high places, necessary tapping may be made at points of highest elevation before the test is made and plugs inserted after the tests have been completed.
2. If the trench has been partially back-filled the specified pressure based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Engineer-in-charge. The duration of the test shall not be less than 5 minutes.
3. ***Examination under pressure:*** All exposed pipes, fittings, valves, hydrants and joints should be carefully examined during the open-trench test. When the joints are made with lead, all such joints showing visible leaks shall be recaulked until tight. When the joints are made with cement and show seepage or slight leakage, such joints shall be cut out and replaced as directed by the authority. Any cracked or defective pipes, fittings, valves or hydrants discovered in consequence of this pressure test shall be removed and replaced by sound material and the test shall be repeated until satisfactory to the Engineer-in-charge.
4. If the trench has been back-filled to the top, the section shall be first subjected to water pressure normal to the area and the exposed parts shall be carefully examined. If any defects are found, they shall be repaired and the pressure test repeated until no defects are found. The duration of the final pressure tests shall be at least one hour.

Procedure for Leakage Test:

5. Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section thereof, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled.

No pipe installation shall be accepted until the leakage is less than the number of cm³/h as determined by the formula:

$$q_1 = ND \frac{\sqrt{P}}{3.3}$$

Where q_1 = the allowable leakage in cm^3/h .

N = number of joints in the length of the pipe line.

D = diameter in mm, and

P = the average test pressure during the leakage test in Kg/cm^2

6. ***Variation from permissible Leakage:*** Should any test of pipe laid disclose leakage greater than that specified in para 5 the defective joints shall be repaired until the leakage is within the specified allowance.

III. DRAINAGE

1. CONSTRUCTING MANHOLES:

At every change of alignment, gradient or diameter of a drain, there shall be a manhole or inspection chamber. Bends and junctions in the drains shall be grouped together in manhole as far as possible. The maximum distance between manholes shall be 30m.

Manholes of different types and sizes as specified shall be constructed in the sewer line at such places and to such levels and dimensions as shown in the drawings or as directed by the Engineer-in-charge. The size specified shall indicate the inside dimensions between brickfaces of the manholes

Where the diameter of the drain is increased, the crown of the pipe shall be fixed at the same level and necessary slope given in the invert of the manhole chamber. In exceptional cases and where unavoidable, the crown of the branch sewer may be fixed at lower level but in such cases the peak flow level of the two sewers shall be kept the same.

Sewers of unequal sectional area shall not be jointed at the same invert in a manhole. The invert of the smaller at its junction with main shall be at least $\frac{2}{3}$ diameter of the main above the invert of the main. The branch sewers shall deliver sewage in the manhole in the direction of main flow and the junction must be made with care so that flow in main is not impeded.

No drain from house fittings, e.g. gully trap or soil pipe, etc., to manhole shall normally exceed a length of 6m unless it is unavoidable.

Manholes 90 x 80 cm are generally constructed within compound for house drainage only and near the buildings for house drainage. Manholes 1.2m x 90 cm are generally constructed for main drainage work for depths less than 1.5m.

Manholes 1.4m x 90 cm are of the arched type and are generally constructed for main drainage works where depth is 1.5m or more. The width of manholes shall be increased more than 90 cm on bends or junctions or pipes with diameter greater than 450mm and that the benching width on either side of the channel is minimum 20 cm.

Manholes 1.4m internal diameter are generally constructed for main drainage works where depth is 2.45m or more as an alternative to manholes of arch type. The diameter shall be increased suitably, for pipes with diameter greater than 450mm in the same manner as in the case of rectangular manholes.

Before deciding size of manholes local municipal byelaws shall be consulted. When manholes are constructed on footpath, these shall be provided with cover of

medium duty casting and when built within the width of the road under vehicular traffic, there shall be provided with cover of heavy duty casting.

2. **CONSTRUCTING DROP MANHOLE:**

- a. In cases where branch pipe sewer enters the manhole of main pipe sewer at a higher level than the main sewer, a drop connection shall be provided. The work shall be carried out as per Drawing. S.C.I pipes and special conforming to IS:1729 – 1964 shall be of the same size as that of the branch pipe sewer.

For 150 and 250mm main line, if the difference in level between the water line (peak flow level) and the invert level of the branch line is less than 60 cm, a drop connection may be provided with in the manhole giving suitable ramp. If the difference in level is more than 60 cm, the drop shall be provided externally.

The main lines upto 350mm dia, are designed for half depth of flow, upto 400 and upto 900mm for 2/3 depth of flow and beyond 900mm for 3/4 th depth of flow.

- b. **Excavation:**

The excavation shall be done for the drop connection at the place where the branch line meets the manhole. The excavation shall be carried upto the bed concrete of the manhole and to the full width of the branch line.

- c. **Laying:**

At the end of branch sewer line S.C.I cross shall be fixed to the line which shall be extended through the wall of the manhole by a horizontal piece of S.C.I pipe to form an inspection or cleaning eye. The open end shall be provided with chain and lid. The S.C.I drop pipe shall be connected to the cross at the top and to the S.C.I bend at the bottom. The bend shall be extended through the wall of the manhole by a piece of C.I. pipe which shall discharge into the channel. Necessary channel shall be made with cement concrete 1:2:4 (1 cement : 2 coarse sand: 4 graded stone aggregate 20mm nominal size) and finished smooth to connect the main channel. The joint between S.C.I. pipe and fittings shall be lead caulked as described. The joint between S.C.I. cross and S.W. branch line shall be made with cement mortar 1:1 (1 cement : 1 fine sand). The exposed portion of the drop connection shall be encased around with minimum 15 cm thick concrete 1:5:10 (1 cement : 5 fine sand : 10 graded stone aggregate 40mm nominal size) and cured. For encasing the concrete around the drop connection, the necessary centering and shuttering shall

be provided. The holes made in the walls of the manhole shall be made good with brick work in cement mortar 1:5 (1 cement : 5 fine sand) and plastered with cement mortar 1:3 (1 cement : 3 coarse sand) on the inside of the manhole wall. The excavated earth shall be back filled in the trench in level with the original ground level.

d. Measurements:

Drop connection shall be enumerated. The depths beyond 60 cm shall be measured in running meters correct to a cm under relevant items.

e. Rate:

The rate shall include the cost of labour and materials involved in all that operations described above but excluding the cost of excavation and refilling.

3. LAYING AND JOINTING CEMENT CONCRETE PIPES AND SPECIALS:

a. Trenches:

Trenches shall be as described in earlier. Where the pipes are to be bedded directly on soil, the bed shall be suitably rounded to fit the lower part of the pipe, the cost for this operating being included in the rate for laying the pipe itself.

b. Laying:

- i. Loading, transporting and unloading of concrete pipes shall be done with care. Handling shall be such as to avoid impact. Gradual unloading by inclined plane or by chain block is recommended. All pipe sections and connections shall be inspected carefully before being laid. Broken or defective pipes or connections shall not be used. Pipes shall be lowered into the trenches carefully. Mechanical appliances may be used. Pipes shall be laid true to line and grade as specified. Laying of pipes shall proceed up-grade of a slope.
- ii. If the pipes have spigot and socket joints, the socket ends shall face upstream. In the case of pipes with joints to be made with loose collars, the collars shall be slipped on before the next pipe is laid. Adequate and proper expansion joints shall be provided where directed.
- iii. In case where the foundation conditions are unusual such as in the proximity of trees or holes, under existing or proposed tracks manholes etc., the pipe shall be encased alround in 15 cm thick cement concrete

1:5:10 (1 cement :5 fine sand: 10 graded stone aggregate 40mm nominal size) or compacted sand or gravel.

- iv. In cases where the natural foundation is inadequate the pipes shall be laid either in concrete cradle supported on proper foundations or on any other suitably designed structure. If a concrete cradle bedding is used the depth of concrete below the bottom of the pipe shall be at least $\frac{1}{4}^{\text{th}}$ of the internal dia of the pipe subject to the minimum of 10 cm and maximum 30 cm. The concrete shall extend up the sides of the pipes at least to a distance of $\frac{1}{4}^{\text{th}}$ of the outside diameter of pipes 300mm and over in dia. The pipe shall be laid in this concrete bedding before the concrete has set. Pipes laid in trenches in earth shall be bedded evenly and firmly and as far up the haunches of the pipe as to safely transmit the load expected from the backfill through the pipe to the bed. This shall be done either by excavating the bottom of the trench to fit the curve of the pipe or by compacting the earth under around the curve of the pipe to form an even bed. Necessary provision shall be made for joints wherever required.
- v. When the pipe is laid in a trench in rock hard clay, shale or other hard material the space below the pipe shall be excavated and replaced with an equalising bed of concrete, sand or compacted earth. In no place shall pipe be laid directly on such hard material.
- vi. The method of bedding and laying the pipes under different conditions are shown in drawing.
- vii. When the pipes are laid completely above the ground the foundations shall be made even and sufficiently compacted to support the pipe line without any material settlement. Alternatively the pipe line shall be supported on rigid foundations at intervals. Suitable arrangements shall be made to retain the pipe line in the proper alignment, such as by shaping the top of the supports to fit the lower part of the pipe. The distance between the supports shall in no case exceed the length of the pipe. The pipe shall be supported as far as possible close to the joints. In no case shall the joint come in the centre of the span. Care shall be taken to see that superimposed loads greater than the total load equivalent to the weight of the pipe when running full shall not be permitted.

Suitably designed anchor blocks at change of direction and grades for pressure lines shall be provided where required.

c. Jointing:

- i. Joints are generally of rigid type. Where specified flexible type joints may also be provided.

ii. **Rigid Spigot and Socket Joint:**

The spigot of each pipe shall be slipped home well into the socket of the pipe previously laid and adjusted in the correct position. The opening of the joint shall be filled with stiff mixture of cement mortar in the proportion of 1:2 (1 cement :2 fine sand) which shall be rammed with caulking tool. After a day's work any extraneous material shall be removed from the inside of the pipe and the newly made joint shall be cured.

iii. **Rigid Collar Joint:**

This is a rigid joint. The two adjoining pipes shall be butted against each other and adjusted in correct position. The collar shall then be slipped over the joint, covering equally both the pipes. The annular space shall be filled with stiff mixture of cement mortar 1:2 (1 cement : 2 fine sand) which shall be rammed with caulking tool. After a day's work any extraneous materials shall be removed from the inside of the pipe and the newly made joint shall be cured.

iv. **Semi Flexible Spigot and Socket joint:**

The joint is composed of specially shaped spigot and socket ends on the concrete pipes. A rubber ring shall be placed on the spigot which shall be forced into the socket of the pipe previously laid. This compresses the rubber ring as it rolls into the annular space formed between the two surfaces of the spigot and the socket, stiff mixture of cement mortar 1:2 (1 cement : 2 fine sand), shall then be filled into the remaining annular space and rammed with a caulking tool. After day's work, any extraneous material shall be removed from the inside of the pipe and the newly made joint shall be cured.

iv. **Semi Flexible Collar joint:**

This is made up of a loose collar which covers two specially shaped pipe ends. Each end shall be fitted with a rubber ring which when compressed between the spigot and the collar, seal the joint. Stiff mixture of cement mortar 1:2 (1 cement :2 fine sand) shall then be filled into the remaining annular space and rammed with a caulking tool. After day's work, any extraneous material shall be removed from the inside of the pipe and the newly made joints shall be cured.

v. **Internal Flush joint:**

The joint is generally used for culvert pipe of 60 cm dia and over. The ends of the pipe are specially shaped to form a self centering joint with an

internal jointing space of 1.3cm wide the finished joint is flush with both inside and outside with the pipe wall. The jointing space is filled with cement mortar 1:2 (1 cement : 2 fine sand) mixed sufficiently dry to remain in position when forced with a trowel or rammer. After day's work, any extraneous material shall be removed from the inside of the pipe and the newly made joint shall be cured.

vi. **External Flush joint:**

The joint is suitable for pipes which are too small for jointing from inside. This joint is composed of specially shaped piped ends. Each end shall be butted against each other and adjusted in correct position. The jointing space shall then be filled with cement mortar 1:2 (1 cement : 2 fine sand) sufficiently dry and finished off flush. Great care shall be taken to ensure that the projecting ends are not damaged as no repairs can be readily affected from inside the pipe.

- vii. In all pressure pipe lines the recess of the end of the pipe line shall be filled with jute braiding dipped in hot bitumen or other suitable approved compound. Pipes shall be so jointed that the bitumen ring of one pipe shall set into the recess of the next pipe. The ring shall be thoroughly compressed by jacking or by any other suitable method.

The number of pipes that shall be jacked together at a time shall depend on the diameter of the pipes and the bearing capacity of the soil, for small pipes upto 25 cm diameter, six pipes can be jacked together at a time.

The quantity of jute and bitumen in the ring shall be just sufficient to fill the recess in the pipe when pressed hard by jacking or by any other suitable method. Before and during jacking, care shall be taken to see that there is no off-set at the joint.

d. **Testing:**

For pressure pipes, the completed pipeline shall be tested for pressure (known at sites test pressure) which shall not be less than the maximum pipeline operating pressure plus the calculated surge pressure, but in no case shall it exceed the hydrostatic test pressure. For non-pressure pipes the joints shall be tested as per procedure laid down under para.

e. **Refilling of trenches:**

The specification described in above shall apply. In case where pipes are not bedded on concrete special care shall be taken in refilling trenches to prevent the displacement and subsequent settlement at the surface resulting in uneven street surfaces and dangers to foundations etc. The

backfilling materials shall be packed by hand under and around the pipe, and rammed with a shovel and light tamper. This method of filling will be continued upto the top of pipe. The refilling shall rise evenly on both sides of the pipe continued upto the top of pipe. The refilling shall rise evenly on both sides of the pipe continued upto 60 cm above the top of pipe so as not to disturb the pipe. No tampering shall be done within 15 cm of the top of pipe. The tamping shall become progressively heavier as the depth of the backfill increases.

f. Measurement:

The lengths of pipes shall be measured in running metres nearest to a cm as laid or fixed, from inside of one manhole to the inside of the other manhole. The length shall be taken along the centre line of the pipes over all fittings such as bend, junctions, etc., which shall not be measured separately.

Excavation, refilling, shoring and timbering in trenches, and cement concreting wherever required shall be measured separately under relevant items of work.

g. Rate:

The rate shall include the cost of materials and labour involved in all the operation described above.

4. LAYING AND JOINTING STONEWARE PIPES:

a. For all sewers and drains, glazed stoneware pipes shall be used as far as possible in preference to other types of pipes. These are suitable, particularly where acid effluents or acid sub-soil conditions are likely to be encountered.

b. Trenches:

i. Specifications described in above shall apply, as far as possible.

ii. The trench shall be so dug that the pipe can be laid to the required alignment and at the required depth. When the pipe line is under a roadway, a minimum cover of 90 cm is recommended for adoption, but it may be modified to suit local conditions. The trench shall be excavate only so far in advance of pipe laying as specified by the Engineer-in-charge. The trench shall be so shored and drained that the workmen may work therein safely and efficiently. The discharge of the trench

dewatering pumps shall be conveyed either to drainage channels or to natural drains.

- iii. The excavation shall be carried out with manual labour or with suitable mechanical equipment as approved by the Engineer-in-charge.
- iv. Unless otherwise specified by the Engineer-in-charge, the width at bottom of trenches for different diameters of pipes laid at different depths shall be as given below:
 - For all diameters, upto an average depth of 120 cm, width of trench in cm = diameter of pipe + 30 cm.
 - For all diameters for depths above 120 cm, width of trench in cm = diameter of pipe + 40 cm.
 - Not withstanding (a) and (b) the total width of trench shall not be less than 75 cm for depths exceeding 90 cm.

c. Laying:

- i. All pipes shall be laid on a bed of 15 cm cement or lime concrete as specified, projecting on each side of the pipe to the specified width of the trench. The pipes with their crown level at 1.20m depth and less from ground shall be covered with 15 cm thick. Concrete above the crown of the pipe and sloped off to meet the outer edges of the concrete, to give a minimum thickness of 15 cm around the pipe. Pipes laid at a depth greater than 1.20m at crown shall be concrete at the sides upto the level of the centre of the pipe and sloped off from the edges to meet the pipe tangentially.
- ii. The pipe shall be carefully laid to the alignments, levels and gradients shown on the plans and sections. Great care shall be taken to prevent sand etc., from entering the pipes. The pipes between two manholes shall be laid truly in a straight line without vertical or horizontal undulation. The pipes shall be laid with socket up the gradient. The body of the pipe shall for its entire length rest on an even bed of concrete and places shall be excavated in the concrete to receive the socket of the pipe.
- iii. Where pipes are not bedded on concrete, the trench floor shall be left slightly high and carefully bottomed up as pipe laying proceeds, so that the pipe barrels rests on firm and undisturbed ground. If the excavation has been carried too low, the desired levels shall be made up with concrete 1:5:10 (1 cement: 5 fine sand: 10 sand graded stone aggregate 40mm nominal size) for which no extra payment shall be made.

- iv. If the floor of the trench consists of rock or very hard ground that cannot easily be excavated to smooth surface the pipe shall be laid on a levelling course of concrete as desired.
- v. When S.W.pipes are used for storm water drainage, no concreting will normally be necessary. The cement mortar for jointing will be 1:3 (1 cement :3 fine sand). Testing of joints will also not be done.

d. Jointing:

- i. Tarred gasket of hemp yarn soaked in thick cement slurry shall first be placed round the spigot of each pipe and the spigot shall then be slipped home well into the socket of the pipes previously laid. The pipe shall then be adjusted and fixed in the correct position and the gasket caulked tightly home so as to fill not more than 1/4th of the total depth of the socket.
- ii. The remainder of the socket shall be filled with stiff mixture of cement mortar in the proportion of 1:1 (1 cement :1 fine sand). When the socket is filled, a fillet shall be formed round the joint with a trowel forming an angle of 45° with the barrel of the pipe.
- iii. After a day's work any extraneous material shall be removed from the inside of the pipe. The newly made joints shall be cured.

e. Testing of Joints:

- i. Stoneware pipes used for sewers shall be subjected to a test pressure of 2.5m head of water at the highest point of the section under test. The test shall be carried out by suitably plugging the lower end of the drain and the ends of the connection if any and filling the system with water. A knuckle bend shall be temporarily jointed in at the top end and a sufficient length of vertical pipe jointed to it so as to provide the required test head, or the top may be plugged with a connection to a hose ending in a funnel which could be raised or lowered till the required head is obtained and fixed suitably for observation.
- ii. If any leakage is visible, the defective part of the work shall be cut out and made good. A slight amount of sweating which is uniform may be overlooked, but excessive sweating from a particular pipe or joint shall be watched for and taken as indicating a defect to be made good.
- iii. Any joint found leaking or sweating, shall be rectified or embedded into 15 cm layer of cement concrete (1:2:4) 30 cm in length and the section retested.

f. Refilling:

In cases where pipes are not bedded on concrete special care shall be taken in refilling trenches to prevent the displacement and subsequent settlement at the surface resulting in uneven street surfaces and dangers to foundations etc. The backfilling materials shall be packed by hand under and around the pipe and rammed with a shovel and light tamper. This method of filling will be continued upto the top of pipe. The refilling shall rise evenly on both sides of the pipe continued upto 60cm above the top of pipe so as not to disturb the pipe. No tamping should be done within 15 cm of the top of pipe.

g. Measurements:

The lengths of pipes shall be measured in running metres nearest to a cm as laid or fixed, from inside of one manhole to the inside of the other manhole. The length shall be taken along the centre line of the pipes over all fittings such as bends, junctions, etc., which shall not be measured separately.

Excavation, refilling, shoring and timbering in trenches, and cement concreting wherever required shall be measured separately under relevant items of work.

h. Rate:

The rate shall include the cost of materials and labour involved in all the operations described above excluding the cost of concrete which shall be paid for separately.

5. CONSTRUCTING ROAD GULLY CHAMBER WITH GRATING:

a. Road Gully Chamber with Horizontal Grating:

The chamber shall be of brick masonry of specified class and shall have a C.I. grating with frame fixed in 15 cm thick cement concrete 1:2:4 (1 cement : 2 coarse sand: 4 graded stone aggregate 20mm nominal size) at the top. The size of the chamber shall taken as the clear internal dimensions of the C.I.frame. The chamber shall have a connection pipe, the length of which in metre between the road gully chamber and the manhole of the drain shall not be less than one by forty (1/40) times the nominal diameter of pipe in mm (i.e. for 150mm connection pipe, length shall not be less than 3.7m and for 250mm connection pipe length shall not be less than 6.25m). The chamber shall be built at the location fixed by the Engineer-In-Charge. Generally the spacing of the chambers shall be 18 to 36m depending upon the grading of the road channel and the area

of the drainage. RCC gully grating shall be fixed in cement mortar 1:2 (1 cement : 2 coarse sand).

b. Road Gully chamber with vertical grating:

The chamber shall be of brick masonry 12mm dia round bar shall be fixed in cement concrete block at the bottom. The bars at the top shall be welded or riveted to M.S. flat 40 x 6mm.

c. Road Gully Chamber with Horizontal and Vertical Grating:

The details of typical road gully chamber of brick masonry shall be same as shown in drawing.

d. Measurements:

Road gully chambers shall be enumerated.

e. Rate:

The rate shall include the cost of materials and labour involved in all the operations described above except the cost of excavation and connection pipes unless otherwise specified.

CLASS NP2 – REINFORCED CEMENT CONCRETE LIGHT - DUTY, NON-PRESSURE PIPES

Int.Diameter of pipes	Barrel Dimensions		Collar Dimensions		Minimum length of collar
	Length	Min.Thickness	Min.Caulking Space	Thickness	
Mm	m	mm	mm	mm	Mm
80	2.0	25	13	25	150
100	2.0	25	13	25	150
150	2.0	25	13	25	150
250	2.0	25	13	25	150
300	2.0 or 2.5 or 3.0	30	16	30	150
350	2.0 or 2.5 or 3.0	32	16	32	150
400	2.0 or 2.5 or 3.0	32	16	32	150
450	2.5 or 3.0	35	19	35	200
500	2.5 or 3.0	35	19	35	200
600	2.5 or 3.0	40	19	40	200
700	2.5 or 3.0	40	19	40	200
800	2.5 or 3.0	45	19	45	200
900	2.5 or 3.0	50	19	50	200
1000	2.5 or 3.0	55	19	55	200
1100	2.5 or 3.0	60	19	60	200
1200	2.5 or 3.0	65	19	65	200

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- A. EXCAVATION
- B. PLAIN, REINFORCED CEMENT/PRECAST CONCRETE
- C. BRICK MASONRY
- D. CEMENT PLASTERING/CEMENT POINTING

V. SPECIFICATIONS FOR CIVIL WORK

MATERIALS – GENERAL

- a. All the materials required in the construction shall conform to the relevant latest Indian Standards specifications unless otherwise indicated. For patented products, the specifications and instructions of the manufacturers will be followed. In case where there are no specifications, then Architects/Employers instructions will be followed. In Case of any discrepancy/dispute regarding specifications, Architect and Employer's decision will be final and binding.
- b. Materials shall be transported, landed and stored at the site or elsewhere in such a manner as to prevent any damage, deterioration or contamination.
- c. The samples of all materials shall be got approved by the Architect and Employer prior to ordering and shall be kept at site office of the Architect & Employer. The materials brought to site shall conform in all respects to the approved samples. Any work executed, without approval for the materials, is liable to be rejected. Accordingly, it will be paid either at tender rates or reduced rates or not to be paid at all, at the discretion of Architect & Employer, whose decision will be final and binding.
- d. The Architect & Employer shall have an option to have any materials tested at the contractor's cost to find out whether they are in accordance with the specifications. All Bills, vouchers, test certificates shall be produced for inspection on demand by the Architect & Employer to ascertain the quality/suitability of materials.
- e. The materials shall be stacked at site as directed by the Architect & Employer.
- f. Any materials rejected by the Architect & Employer, shall be removed by the contractor from the site within 24 hours at his own cost.
- g. The contractor shall include the elements of wastage of materials in his rates for various items.
- h. The Architect & Employer shall have the power to cause the contractors to purchase and use such material from any particular source at his opinion be necessary for proper execution of work.

A. **EXCAVATION:**

A – 1. **EXCAVATION AND EARTH WORK:**

A.1.1. **Examination of the Site:**

The contractor shall visit and ascertain the nature of the ground to be excavated and the works to be done and shall accept all responsibility for the cost of the work involved.

A.1.2. **Setting out:**

The contractor shall set out the center line of the building or other involved works after clearing the site and get the same approved from Architect & Employer. It shall be the responsibility of the Contractor to install substantial reference marks, bench marks etc., and maintain them as long as required by the Architect & Employer. The Contractor shall assume full responsibility for proper setting out, alignment, elevation and dimension of each and all parts of the work.

A.1.3. **Ground level and Site level:**

Before starting the excavation, the requisite block levels of the entire plot shall be taken by the contractor, in consultation with the Architect & Employer, and a proper record of these levels kept, which shall be jointly signed by the contractor and the Architect & Employer. A block level plan showing all ground levels of the plot shall be prepared and shall jointly be signed by the contractor and the Architect & Employer. The levels shall be taken at intervals of 3M, or even less, as required and directed.

A.1.4(a) **Excavation and Preparation of foundation for concreting:**

Excavation shall include removal of all materials of whatever nature at all depths and whether wet or dry, necessary for the construction/foundation and sub-structure (including mass excavation for underground reservoirs, where applicable) exactly in accordance with lines, levels, grades and curves shown in the drawings or as directed by the Architect & Employer. The bottoms of excavation shall be levelled both longitudinally and transversely or sloped as directed by the Architect & Employer.

Should the contractor excavate to a greater depth or width than shown on the drawings, he shall at his own expense fill the extra depth or width in cement concrete in proportion as directed by Architect & Employer but in no case with concrete of mix leaner than 1:4:8 cement concrete, at no extra cost.

The contractor shall report to the Architect & Employer when the excavations are ready to receive concrete. No concrete shall be placed in foundations until the contractor has obtained Architect and Employer's approval. In case, the excavations done through different stratas of soil and if the same are payable as per provisions in the Schedule of Quantities, the contractor shall get the dimensions/levels/ heights of each of the strata recorded/decided by the Architect & Employer for payment. If no specific provision is made for different strata in the schedule of quantities, it will be presumed that excavation shall be in all types of soil and the contractor's rate shall cover for the same viz., for all types of soil (only excluding hard rock, when so specifically provided for).

After the excavation is passed by the Architect & Employer and before laying the concrete, the contractor shall get the depth and dimensions of excavations and levels (and nature of strata as applicable as per Schedule of Quantities like hard rock, soft rock etc.,) and measurements recorded from the Architect & Employer.

Measurement of Excavation in Rock:

Excavated soft/disintegrated rock and hard rock should not be mixed up and shall be stacked separately for purpose of payment. (Even otherwise they shall be stacked separately, and not mixed up with soils). Minimum of the quantities arrived at from

- i) Levels/pit measurements for sheet rock.
- ii) Volume based on stack measurements reduced by 40% to account for voids in stacks for Builders/overcops.

shall be considered for purpose of payment.

- A.1.4(b) The contractor shall be responsible for safe custody of these stacks, till the same are taken over by the Employer or completion of work, whichever is earlier. The rates quoted for excavation shall include costs of all these and nothing extra shall be paid towards the same.

A.1.5 **Shoring:**

The sides of the excavations should be timbered and shored in such a way as is necessary to secure them from falling in, and the shoring shall be maintained in position as long as necessary. The contractor shall be responsible for the proper design of the shoring to hold the sides of the excavation in position and ensure safety against injury to persons. The shoring shall be removed as directed after the items for which it is required are completed. In case the contractor wants to step/slope the sides of foundation

suitably, in lieu of shoring, he should get prior approval for it from the Architect & Employer and nothing extra shall be paid for same and as well for the additional back fill necessitated by it, viz., items of excavations and backfilling be limited to excavations as per plans only and no quantities involved in making slopes and consequent back filling will be paid for.

A.1.6. **Earthwork for levelling of the area:**

Before earthwork is started, the area coming under cutting and filling shall be cleared of shrubs, rank vegetation, site grass, brushwood and trees and saplings of all girths, and rubbish removed outside the periphery and as directed by the Architect & Employer. The roots of trees shall be removed to a minimum depth of 600mm below ground level or 300mm below formation level whichever is lower and the hollows filled up with approved earth, levelled and rammed to the satisfaction of the Architect & Employer.

Under no circumstances undermining or undercutting be allowed. The final surface shall be neatly dressed and compacted to the required levels. Any extra cutting done, shall be filled back with approved earth, duly consolidated at contractor's cost. During the execution of the work, the natural drainage of the area shall be maintained by the contractor.

The approved earth from cutting shall be directly used for filling as directed. The filling shall be done in layers of not more than 150mm, each layer watered and consolidated with roller, not less than 10 M.T. roller. The earth used for filling shall be free from all roots, rubbish, grass, and all lumps and clods shall be broken before filling. The top surface of finally finished area shall be neatly dressed and compacted.

A.1.7 **Protection:**

If instructed by the Architect & Employer all foundation pits, and similar excavations shall be provided with strong fence and marked with red lights at night to avoid accidents. Adequate protective measures shall be taken to see that the excavation does not affect or damage adjoining structures. All measures required for the safety of the excavations, the people working in and near the foundation trenches, property and the people in the vicinity shall be taken by the contractor at his own cost, he being entirely responsible for any injury and damage to property caused by his negligence or accident due to his constructional operations.

A.1.8 **Stacking of excavated materials:**

All materials excavated will remain the property of the Employer and rate for excavation includes sorting out of useful materials and stacking them on site as directed. Materials suitable and useful for back filling, plinth filling or

levelling of the plot or other use shall be stacked in convenient places but not in such a way as to obstruct free movement of men, animals and vehicles or encroach on the area required for constructional purposes.

A.1.9 Backfilling:

All shoring and formwork shall be removed after their necessity ceases and trash/slush of any sorts shall be cleaned out from the excavation. All space between foundation masonry or concrete and the sides of excavation shall be refilled to the original surface with approved excavated materials in layers, each not exceeding 150mm in thickness, watered and rammed. The filling shall be done after concrete or masonry is fully set and done in such a way as not to cause undue thrust on any part of the structure. Where excavated materials are to be used for refilling, it shall be brought from the place, where it is temporarily stacked, and used in refilling.

No excavation of foundations shall be filled in or covered up, until all measurements of excavations, masonry, concrete and other works below ground level are jointly recorded. Black cotton soil shall not be used for back filling or in plinth filling. In case back filling is done without recording measurements of foundation work, the contractor will have to remove back filling at his cost for taking measurements. Otherwise, the foundation work will not be measured and will be paid for.

A.1.10 Dewatering:

Rate for excavation shall including bailing or pumping out water, which may accumulate in the excavation during the progress of work either from seepage, springs, rain or any other cause whatsoever, and diverting surface flow, if any, by bunds or any other appropriate means. Pumping out water shall be done in such an approved manner as to preclude the possibility of any damage to the foundation trenches, concrete or masonry or any adjacent structure. When water is out water shall be from auxiliary pits of adequate size, dug slightly outside the building excavations, the depth of auxiliary pit shall be more than the working foundation trench levels. The auxiliary pit shall be refilling with approved excavation materials after the dewatering is over.

The excavation shall be kept free from water:

- a. During inspection and measurement.
- b. When concrete and/or masonry are in progress and till they come above the natural water level and
- c. Till the Architect & Employer consider that the concrete/mortar is sufficiently set.

- A.1.11 Rates quoted for excavation shall include all these (A.1.1. to A.1.10) operations to the extent required for completing the work please see A.3 also, unless otherwise specifically provided for.

A.1.12 **Surplus excavated materials:**

The item of removal of surplus excavated materials shall only be undertaken by the contractor when specific instruction in this regard has been obtained from the Employer/Architect. The contractor must also secure the approval of the Architect & Employer regarding the quantity of surplus materials to be removed prior to commencement of this item of work. The contractor shall dispose of surplus excavated materials anywhere with in the site as required and as directed. He will spread the same in layers of 150mm each and as directed. Contractor will take the decision of Architect & Employer for disposal of surplus excavated material and no extra will be paid for double handling of the same, if any. Wherever surplus or unsuitable material is to be disposed off outside the site, it shall be dumped and spread at the places to be specifically approved and as directed by the Architect & Employer, with all leads and lifts (unless otherwise provided for), and shall be paid as a separate item, as stated in the schedule of quantities.

A – 2 **ROCK EXCAVATION:**

A.2.1 **Ordinary Soft rock comprises of:**

- a. Limestones, sandstones, laterite or disintegrated rock which can be split or be quarried with crow bars or wedges.
- b. Unreinforced cement concrete, stone masonry in cement mortar.

A.2.2. **Hard rock comprises of:**

- a. Any rock or cement concrete for the excavation of which the use of mechanical plant or blasting is required, or which cannot be removed with iron crow bars.
- b. Reinforced cement concrete below ground level.
- c. Where blasting is prohibited for any reasons, the excavation has to be carried out by chiselling, wedging or any agreed method.
- d. Rock which requires chiselling/blasting/compressor.

- A.2.3 Hard rock encountered in excavation work shall be removed by chiselling or wedging as directed by the Architects/Employers and no blasting is permitted.
- A.2.4 Rock excavation shall comply with the specifications for excavation, except that it shall be of soft or hard rock.
- A.2.5 Rock excavation will be measured and paid for quantities computed from (i) pit measurement/levels or (ii) by stack measurements reduced by 40% to account for voids, whichever is less.

A – 3 **RATES TO INCLUDE FOR EXCAVATION ITEMS:**

Apart from other factors mentioned elsewhere in this contract, rates for the item of excavation shall also include for the following:

- A.3.1. Clearing the site of all bushes, grass, roots of trees etc., and carting away from the site.
- A.3.2. Setting out works, profiles etc., as required.
- A.3.3. Providing shoring and shuttering to avoid slipping/sliding of soil and to protect adjacent structures, and subsequently removing the same.
- A.3.4. Bailing and pumping out water as required and directed.
- A.3.5. Excavation at all depths (unless otherwise specified in the schedule of quantities) and removal of all materials of whatever nature, wet or dry, with all leads (unless otherwise provided for) and necessary for the construction, foundation, underground reservoir etc., preparing bed for laying concrete, for roads etc., and completing the work.
- A.3.6. Sorting out useful excavated material and conveying beyond the structure and stacking them neatly on the site for back filling or reuse etc., as directed.
- A.3.7. Necessary protection including labour, barricades, materials and equipments etc., to ensure safety and protection against all risks and accidents.

Please see A.1.11.

A – 4 **MODE OF MEASUREMENT:**

- A.4.1 Excavation for foundation of columns, beams, walls, and the like shall be measured and paid net as per drawing, dimensions of concrete (bed concrete where so specified) at the lowest level. In regard to length and breadth and depth shall be computed from the concerned excavation levels and ground level taken before excavation. Any additional excavation required for

working space, formwork, planking, dewatering and strutting etc., shall not be measured and paid for separately but rates quoted for excavation shall include for all these factors. No increase in bulk after excavation shall be paid for. Excavation beyond dimensions of mass concrete for foundation as per drawing or below required depth shall not be paid for. Any excavation beyond required level shall be filled back with cement concrete of mix not leaner than 1:4:8, at his cost.

- A.4.2 Measurement for general excavation/filling in roads/areas shall be made on sectional measurement by taken levels jointly before starting the work and after completion of the work and shall be worked out on average area method. This will give the total quantity of excavation. Levels shall be taken at 3m intervals or closer as required and directed by the Employer & Architect.
- A.4.3. In the case of filling by morrum brought from outside, the quantities will be worked out from levels, as stated above, and shall be calculated/checked with lorry measurements, after deducting 20% for shrinkage. In case of inadequate information regarding lorry measurement and/or number of lorry trips, Employers/Architect's decision will be final and binding.
- A.4.4 In case of all fillings, in exposes and open areas, 10% deduction will be made from the total quantities in the running bills, out of which 5% will be deducted permanently and balance 5% will be paid after expiry of the defects liability period of one year or one monsoon, whichever is more and after making good levels, surface etc., as required and directed.
- A.4.5 In case of soft and hard rock, payments shall be limited to minimum of the quantities arrived at from levels or stack measurements (after deducting 40% for voids). The material shall be stacked on fairly level ground and places, as directed. All depressions over the required final levels will be made good by P.C.C. of mix not leaner than 1:4:8 as directed, at no extra cost.
- A.4.6 The quantity of excavated materials disposed off outside the premises will be worked out on the basis of total quantity of excavation less follows:
- A.4.6.1. Quantity of excavated (other than rock) materials used for filling (on the basis of levels).
- A.4.6.2. Quantity of rock excavation (Stack measurements less 40% or level basis).
- A.4.6.3. Quantity of excavated materials disposed of within the site (on the basis of levels).

The quantity worked out on these basis will be checked with lorry measurements, with deduction of 20% for looseness/shrinkage. In case of any discrepancy, Architect & Employer's decision will be final and binding.

- A.4.7. Total quantity of excavation and filling will be finalised on the basis of levels only. The total quantity of excavation will be checked by adding quantities of the following items:
- A.4.7.1. Material used for filling wherever required (on level basis).
 - A.4.7.2. Rock excavation minimum of quantity arrived from stack measurements with 40% voids) or based on levels.
 - A.4.7.3. Surplus/unsuitable material disposed within site on level basis (deducting 10% voids if consolidated, otherwise deducting 20%). In case of lock 40% voids will be deducted.
 - A.4.7.4. - do – disposed outside site (on lorry measurements and by deducting 20% for looseness/shrinkage if transported by lorries, otherwise on basis of levels and by deducting 10% voids if the fill is consolidated – otherwise 20% voids shall be considered.

In case of any discrepancy, the decision of Employer & Architect shall be final and binding for the above sub-divisions A.4.7.1, A.4.7.2, A.4.7.3 & A.4.7.4 as stated above.

- A.4.8. Whenever the contractor is instructed to reuse the excavated rock for works such as masonry, soiling, filling etc., the measurement for such items shall be the same/equivalent as that of rock measured under excavation items earlier. The contractor will not be paid for double handling of such excavated materials.

B. PLAIN AND REINFORCED PRECAST CONCRETE WORK:

B.1. APPLICATION OF SPECIFICATIONS:

- B.1.1 Notwithstanding what is stated in the specification herein, detailed architectural and structural drawings and notes appended there on shall be deemed to form part of the specifications and to supersede these, in case of any discrepancy.

B.2. GENERAL:

- B.2.1 The structural and architectural drawings shall be studied thoroughly and any discrepancy in the dimensions on the drawings or any other point not clear to the contractor shall be brought to the notice of Architect & Employer well in advance, and got decided from them before further proceeding with the work.
- B.2.2. No concrete works shall be carried out in the absence of authorised and qualified supervisor of the client/Architect.

B.3. **MATERIALS:**

B.3.1. **General:**

- B.3.1.1. All the materials constituting the concrete shall conform to the relevant latest Indian Standard Specifications, unless otherwise indicated.
- B.3.1.2. Materials shall be transported, handled and stored on the site or elsewhere in such a manner as to prevent damage, deterioration or contamination.
- B.3.1.3. All the materials such as sand, coarse aggregates, cement and water shall be got tested in any approved laboratory, as directed by the Employer & Architect, before starting the concrete work. During construction also all these materials will have to be tested, as often as deemed necessary by the Employer & Architect.

B.3.2. **Cement:**

Cement shall be ordinary Portland cement 43 grade and of approved brand confirming to IS 8112 – 1989 unless otherwise specified. The contractor shall procure cement of makes – L & T, RAASI, KCP, ACC, Rajashree, or any other manufacturer as approved by Architect. The contractor may use ordinary Portland Cement of 53 grade of the makes specified above by obtaining written permission from the Architects/Employer. It shall be stored by the contractor in a dry, watertight and properly ventilated structure as per specified conditions. The cement shall be stacked on a dry raised platform, 1'-0" above the floor level and shall be stacked in the sequence of receipt of consignments. Not more than 10 bags should be kept in one stack. Any cement which has deteriorated, caked or which has been damaged due to any reason whatsoever shall not be used. Cement, concerning which there is any doubt, shall be got tested by the contractor at his cost and used, only if found satisfactory. Condemned/damaged cement shall be removed immediately from the site by the contractor at his cost. Daily account of receipt and use of cement bags shall be maintained by the contractor in the proforma approved by the Architects/Employer and got checked by the Employer's Engineer at site. Cement should be used in the order in which it is received at site. Cement stored for more than three months shall be got tested, before using it in the work.

B.3.3. **Sand:**

Sand shall be well graded, coarse in texture, clean, hard and free from salt, earth, clay or any other harmful material. Before starting the work, the contractor shall get samples of sand, locally available from different sources, if required, and the same shall be got tested as per latest relevant B.I.S. codes

for concrete work and to get the final approval of Employer & Architect. During the course of the construction or for any reasons it is observed that the sand, procured by the Contractor from previously approved source, is not upto the approved standard or it is not available in sufficient quantity required for the entire project, then the contractor will have to make such alternative arrangements to procure the sand of approved quality from any other source, even with longer lead at no extra cost. Sand shall be screened and washed, if required, as directed by the Employer & Architect/at no extra cost. Field tests shall be carried out regularly and as directed, to ensure the suitability/quality of the same. Silt content should not exceed 8% by volume or 5% by weight, and should be free from other deleterious materials. When sand is mixed by volume, necessary allowance shall be made for bulkage, as required and directed to give correct mixture.

B.3.4. Coarse Aggregate:

Coarse aggregates shall consist of hard, dense, durable uncoated crushed Granite rock. It shall be free from soft, friable, thin or long laminated pieces. All aggregates should generally confirm to IS 383 – 1970. For reinforced cement concrete, the maximum size shall be not more than 20mm and minimum shall not be less than 5mm and shall be uniformly graded to the approval of Employer & Architect. If locally available coarse aggregate is not suitable or is not sufficient in quantity, the contractor shall have to procure it from any other source, even with longer leads at no extra cost. As and when directed by Employer & Architect, aggregates shall be washed by approved methods at contractor's cost. Necessary tests shall be carried out, as and when required to ascertain about the suitability and grading of the aggregated, by the contractor at his cost.

B.3.5. Water:

Water shall be clean, fresh and free from organic or inorganic matters in solution or suspension in such amounts, that may impair the strength or durability of the concrete. Water fit for drinking will generally be found suitable for use in concrete and plastering work. However water shall be tested periodically for its use in construction work.

B.3.6. Reinforcement:

B.3.6.1. Mild steel bars:

Mild steel reinforcement bars shall conform to I.S.432 – 1982 “Part I” Fe 410 – S, other qualities of steel shall not be acceptable.

B.3.6.2. High strength deformed bars:

Where deformed high strength reinforcement bars are specified, the contractor shall use tor steel, accompanied by a test certificate from the manufacturer, conforming to IS – 1786 – 1986 and shall be Fe 415 grade. Contractor shall bet steel reinforcement tested at his cost as and when required and directed by Employer & Architect.

Steel shall be from the main manufacturers i.e., SAIL/TISCO/VSP or any other manufacturer as approved by Architect & Employer.

B.6.0. Strength of Concrete:

B.6.1. The concrete mix shall be so made to produce the desired grade concrete having the required workability and characteristic strength not less than values given below:

Grade Definition	Specified Minimum Characteristic compressive strength at 28 days
M – 15	150 Kg/Sq.cm
M – 20	200 Kg/Sq.cm
M – 25	250 Kg/Sq.cm
M – 30	300 Kg/Sq.cm

Strength of concrete required for various situations have been clearly stipulated in the relevant item of the schedule of quantities and/or in the drawings. As required by the Architect, the water content and the water/cement ratio shall be determined from the results of tests of the materials proposed for use, in advance of construction. It is important to maintain constant water cement ratio at its correct value.

If the concrete produced at site does not satisfy the above strength requirements, the Architect & Employer will reserve the right to require the contractor to improve the method of batching, the quality of the ingredients and the mix with increased cement contents, if necessary. The contractor shall not be entitled to claim any extra cost for the extra cement used or for the modifications, for fulfilling the strength requirements as specified. The able guide for the quality and for durability of concrete. It must also have an adequate cement content and as well a low water – cement ration, as given below, which is applicable for moderate weather conditions, as specified in I.S. 456 – 1978.

MINIMUM CEMENT CONTENT	MAXIMUM WATER – CEMENT RATIO
Moderate conditions 290 Kg/Cum	0.55

The minimum cement contents is based on 20mm aggregates. For 40mm aggregate it should be reduced by about 10% and for 12.5mm aggregate it should be increased by about 10%.

B.10. **PRECAST CONCRETE:**

B.10.1. All provisions in the specifications for concrete shall apply to precast concrete except for the specific variations given herein below:

B.10.2. **Aggregate:**

For maximum size of aggregate shall not be larger than one third of the minimum dimension of the member.

B.10.3. **Concrete Cover:**

For all surfaces not exposed to weather, all reinforcement shall be protected by concrete equal to the nominal diameter of bars but not less than 15mm.

B.10.3. **Concrete Cover:**

For all surfaces not exposed to weather, all reinforcement shall be protected by concrete equal to the nominal diameter of bars but not less than 15mm.

B.10.4. **Care:**

The concrete in one precast piece shall be placed in one operation. No piece shall be removed from the mould or erected until sufficiently natured to ensure that no damage may occur to the piece.

B.10.5. **Details:**

All details of jointing, inserts, anchors and bearing widths etc., shall be as shown in the drawings.

B.10.6. **Identification and Marking:**

All precast concrete members shall be properly marked to indicate the top of the member and its location.

B.10.7 Transportation, Storage and Erection:

While handling, including loading/unloading, the members shall be supported/hung at such suitable points, so that the member may safely withstand all the loads/stresses etc., that may occur/develop. For this, suitable hooks/markings etc., shall be provided, while casting itself, as may be necessary and or as directed.

B.10.7.1. Units shall be stored, transported and placed so that they will not be over stressed/pressed or damaged.

B.10.7.2. Precast concrete units shall be adequately braced and supported during erection to ensure proper alignment and safety and such bracing and supports shall be maintained until there are adequate permanent connections.

C. MASONRY:

C.1. BRICK MASONRY:

C.1.1. Bricks:

- a. The bricks shall be of best locally available quality, and having the specified crushing strength, and shall be of quality approved by the Employer & Architect before placing orders for the same.
- a. They shall be sound, hard and well burnt. They must give a ringing sound when struck with a metal piece and shall have frog.
- b. They shall be free from cracks, flaws and nodules and also free from lime or stone pieces.
- c. All bricks when dry, shall have an average compressive strength not less than 35 Kg/Sqcm, unless otherwise specified.
- d. The bricks wherever specified as wire cut and or machine made, shall have compressive strength not less than 75 Kg/sq.cm, unless other wise specified. The crushing strength bricks of bricks which vary by more than 15% of average strength of that group of sample, must be omitted and average strength of balance bricks only shall be considered as representative of that lot of bricks.

- e. The contractor shall produce different brands of locally available bricks for approval by the Employer & Architect. If during the execution of the work, it is observed that the bricks of approved brand/quality are not sufficient in quantity or Manufacturer's have not maintained the same approved quality, then the contractor shall make alternate arrangements to procure bricks from any other source even with longer leads without any extra cost, after getting same approved in advance by the Architect & Employer, as done earlier.
- f. If the contractor executes the work, without approved quality of bricks, the same shall be liable for rejection or paid at reduced rates, at the sole discretion of the Employer & Architect, which shall be final and binding.

C.1.2. **Mortar:**

The sand should be only of approved quality and 'Coarse' unless otherwise specified. It will be screened and/or washed, if required and directed, without extra cost. Unless otherwise stated, cement mortar for brick work shall be of 1:6 (1 cement : 6 sand) proportion for walls of one brick thick and above. While for half brick walls or brick on edge work cement mortar shall be of 1:4 (1 cement :4 sand) proportion.

C.2. **WORKMANSHIP:**

C.2.1. **Proportion and mixing of cement mortar:**

Cement and sand shall be mixed in the specified proportion by volume by emptying cement bags on measured quantity of sand and thoroughly turning over the mixture in a dry state, till uniform colour is obtained. The mixture is made into the form of a frustrum of a cone with a hollow at top centre, and then water added to it. The whole material is then thoroughly turned and mixed till mortar is homogeneous; and shall be mixed only for such quantities, which can be readily used. Not more than 30 minutes should pass between adding of water to the dry mixture and the actual placings of mortar in position.

C.2.2. **Construction:**

- C.2.2.1. All brick work shall be set out and built to lines, levels, batters, curves and to any shape or position to dimensions, thickness and heights shown upon the drawings, and a good bond shall be preserved throughout the work both laterally and transversely. English bond shall be used throughout.
- C.2.2.2. All bricks shall be thoroughly wetted before use in the manner that water penetrates to the full depth of brick stock, and every brick is fully soaked.

- C.2.2.3. Single or double scaffolding of adequate strength shall be provided for all types of loads likely to come on them during construction. In case of single scaffoldings all the scaffolding holes shall finally be filled with cement concrete 1:3:6 (1 cement :3 coarse sand : 6 graded stone aggregate, 20mm nominal size) at contractor's cost.
- C.2.2.4. All courses shall be laid truly horizontal and all vertical joints made truly vertical.
- C.2.2.5. Where water is met within foundations, work space shall be kept free of water by the contractor while the brick work is in progress and until the mortar, pointing, plastering have properly set.
- C.2.2.6. No half or quarter brick shall be used except as closures. The closures shall be horizontal and the walls shall be raised plumb. Not more than ten courses shall be raised in a day and no part of the work shall be raised more than one meter above another at any time.
- C.2.2.7. Joints shall be uniform in thickness. All joints shall be adjusted to its final position in the wall while the mortar is steel soft and plastic. All vertical joints shall be full of mortar and well compacted with trowel and just sufficient water (so that cement/mortar does not flow out of the joints). No looseness/hollows in the mortar (in the joints) shall be permitted. Any unit, which is disturbed after mortar has stiffened or the mortar in the joints is loose or has hollows, shall be removed and re laid with fresh mortar.
- C.2.2.8. All joint shall be raked out, while the mortar is still green, to a depth of 10mm (minimum) to ensure a good key for plastering.
- C.2.2.9. Half brick walls shall be reinforced at every 4th bedded course with 25 x 1.5mm hoop iron reinforcement well in mortar, properly lagged etc., and as directed by the Architect. Alternatively two 6mm dia bars be embedded in cement mortar in same locations.
- C.2.2.10. In brick arches or other circular work, the bricks shall be shaped to slope, joints radiating outward and correctly from the center, front to back of walls and joints shall be not more than 12mm thick.
- C.2.2.11. All brick work shall be adequately watered atleast for three times as day, for ten days continuously.
- C.2.2.12. During the rains and frosty weather, the work shall be carefully covered, without extra charge, so as to prevent any mortar being washed away etc. Should any brick work be damaged, the same shall be removed and rebuilt at the contractor's expense.

- C.2.2.13. Chases and raked out joints shall be kept free from mortar or other debris. Spaces around door frames and other built-in items shall be solidly filled with cement mortar 1:3 (1 cement :3 coarse sand) or cement concrete 1:3:6 (1 cement :3 coarse sand : 6 hard stone aggregate of suitable size). Anchors, wall plugs, accessories, flashings and other items required to be built in with masonry shall be built in as masonry work progresses. Unfinished work shall be stepped back for jointing with new work. Toothing may be resorted to, only when specifically approved by the Architect. Before new work is started, all loose mortar shall be removed and the exposed joints shall be thoroughly cleaned before laying new work.

C.3. **RATES TO INCLUDE:**

Apart from other factors mentioned elsewhere in this contract, the rates for brick masonry shall also include following:

- C.3.1. All materials, labour, tools/equipment used and other items intended for the satisfactory completion of brick masonry at all heights and depths.
- C.3.2. Erecting and removing of all single or double scaffolding, (as may be directed/specified), ladders required for the execution of the work at any height and depth and shape as shown in drawings or as directed by the Architect & Employer, and as well cleaning everyday the surface of masonry executed on that day.
- C.3.3. Cutting of brick work, raking out joints to received plaster, removing stains and mortar lumps, making required chases and openings and filling the chases with cement mortar not leaner than 1:4 (1 cement :4 coarse sand), all as specified/directed.
- C.3.4. Reinforcement embedded in cement mortar, including cost of reinforcement, in half brick walls and brick on edge work.
- C.3.5. Dewatering, wherever required.

C.4 **MODE OF MEASUREMENT:**

All brick work, except half brick work and brick on edge, shall be measured in cubic meters. Half brick and brick on edge will be measured in Sq.meters. Deductions shall be made for all openings, lintels, beams, chajjas/shelves bearings, and the like and columns etc., occupying full thickness of the walls. No deductions will be made for ends only of

- i. Dissimilar materials like girders, beams, lintels, rafters etc., upto 500 Sq.cm. cross section, and for

ii. Openings upto 0.1 Sq.m. in face area.

E. **CEMENT PLASTERING/CEMENT POINTING:**

E.1.0. **MATERIALS:**

E.1.1. Cement, sand and water constituting the materials for the work shall conform to the specifications laid down for the concrete work. Fine sand shall be used as per IS Code.

E.1.2. Lime required for neeru finish shall be of approved variety fat lime.

E.1.3. Mortar shall be in proportions specified in the bills of quantities.

E.2.0. **WORKMANSHIP:**

E.2.1. **General:**

E.2.1.1. Adequate single scaffolding (if specifically permitted) shall be provided by the contractor at his expense and the scaffolding holes shall be filled in with cement concrete 1:3:6 (1 cement : 3 coarse sand: 6 hard graded stone aggregate 20mm size) compacted well and plastered over before lowering the scaffolding just below, if any, without any extra cost. In case double scaffolding is done, nothing extra shall be paid.

E.2.1.1. Dewatering the foundation if required, shall be done by the contractor at his own cost.

E.2.1.2. The surfaces to be plastered shall be first cleaned and watered well in advance and thoroughly wetted before plastering.

E.2.1.3. Smooth surfaces of concrete, old plaster etc., shall be suitably roughened or removed to provide necessary bond for the plaster. All dirt, spots, oil paint etc., which prevents proper bond with plaster, shall be removed.

E.2.1.4. Patches of plaster 150 x 150mm shall be put on about 3 meter apart as gauges, to ensure even plastering in one plane.

E.2.1.5. All plaster work will be done to lines levels and plumb and to the satisfaction of Architect & Employer.

E.2.1.6. For walls, columns and beams, thickness will be minimum 20mm for external faces and 15mm thick for internal faces, while for ceiling it shall be average 10mm, unless otherwise specified in bill of quantities.

E.2.1.7. The thickness specified shall be minimum and measured from the proudest part of the surface.

E.2.1.8. Unless otherwise stated in Bill of Quantities, cement mortar shall be in 1:4 (1 cement :4 fine sand) proportion.

E.2.4. **Water proof cement plaster:**

This shall be all as specified herein before for cement plaster work except for the following:

- a) No neeru finish shall be applied over the rendered surface, but the rendered surface itself shall be finished smooth by steel trowelling.
- b) In the preparation of cement sand mortar, cement shall be mixed with an approved waterproofing compound such as pudlo, CICO No.1 water lock, impermo, composeal or of any other standard manufacturer as per the manufacturer's instructions and as directed by the Architects.

E.2.5. **Rate to include:**

Apart from other factors mentioned elsewhere in the contract, rates for plastering shall also include following:

E.2.5.1. All materials, labour, use of tanks/implements for satisfactory completion of the work.

E.2.5.2. Erection, dismantling and removing single/double scaffolding.

E.2.5.3. Preparing all the surfaces to secure plaster.

E.2.5.4. Providing cement plaster of specified average thickness (measured from the proudest part of BB/stone work) and proportion at all heights and depths and to any shape as directed.

E.2.5.5. Curing for 7 days.

E.2.5.6. Chicken mesh of approved gauge shall be provided at all the junctions of concrete, masonry, timber and grouting of chases made for electrical/plumbing or other prupose as directed at no extra cost. Prover V-grooves must be made at all junctions of walls and slabs/beams/columns etc., at no extra cost.

E.2.5.7. Any moulding, bends, arisers, gooves/drip mould, rounding/Vatas, chamfering, soffits of arches, and also making good damaged plaster after

their (Contractor's) all the sub contractor or nominated sub contractors have done their work.

E.2.6. **Mode of Measurement:**

All plastering will be measured in square metre, unless otherwise described, as per relevant I.S. code.

Walls:

The measurement of walls plastering shall be taken between the walls or partitions for the length and from top of floor or skirting upto the ceiling bottom for the height. The dimensions before plastering shall be taken.

Ceiling:

Ceiling shall be measured between walls or partitions and the dimensions before plastering shall be taken. Ceilings with projected beams shall be measured over beam and the plastered side of the beam shall be measured and added to plastering on ceiling.

For jambs, soffits, sills, etc., for openings not exceeding 0.5 sq.m. each in area, ends of joists, beams, posts, girders, steps etc., not exceeding 0.5 sq.m each in area and openings not exceeding 3 sq.m each., deductions and additions shall be made in the following manner.

- E.2.6.1. No deduction shall be made for ends of joists, beams posts etc., and openings, not exceeding 0.5 sq.m. each, and no addition shall be made for reveals, jambs, soffits, sills, etc., of these openings no for finishing the plaster around ends of joists, beams, posts, etc.
- E.2.6.2. Deductions for openings exceeding 0.50 sqm but not exceeding 3 sqm each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills, etc., of these openings.
- E.2.6.3. Deductions for openings exceeding 0.50 sqm but not exceeding 3 sqm each shall be made as follows and no additions shall be made for reveals, jambs, soffits, sills, etc., of these openings.

When both faces of wall are plastered with the same plaster, deduction shall be made for one face only.

When two faces of wall are plastered with different plasters or if one face is plastered and the other pointed, deduction shall be made from the plaster or pointing, on the side of frames for doors, windows, etc., on which the width of

reveals is less than that on the other side, but not deduction shall be made on other side.

- E.2.6.4. In case of openings of area above 3 sq.m each, deductions shall be made for the openings, but jambs, soffits and sills shall be measured.

**LIST OF MATERIALS OF APPROVED BRAND OR MANUFACTURER AND
SPECIALISED AGENCIES**

(CIVIL) APPENDIX 'A'

LIST OF APPROVED MAKE OR BRANDS – W.S. AND SANITARY WORK

APPENDIX – 'B'

Note: The contractor shall so quote for items to cover the costs of the materials as specified below with ISI mark wherever applicable. The materials for which ISI mark is not available for any of the 'Makes' listed below, the best of these makes shall be provided and the decision of Architect & Employer shall be final in deciding which brand is the best quality. The contractor shall obtain prior approval from the Architect/client before placing order for the specific materials/agencies. In case of non-availability of any of the approved/specified materials/Agency, during the execution of the work, the Architect & Employer may approved suitable equivalent brand/Agency and his decision shall be final and binding on the contractor and the price variations if any, shall be adjusted accordingly.

- | | | | |
|----|--|---|---------------------------------|
| 1. | HDPE pipes | : | Godavari/Kissan or equivalent. |
| 2. | C.I.pipes for water supply | : | Kesoram or equivalent. |
| 3. | C.I.Sluice valves | : | Kirloskar or any ISI make |
| 4. | R.C.C. pipes | : | Indian Hume pipe or equivalent. |
| 5. | Brass & gun metal globe gate valves feet valves. | : | Leader / Zolota or equivalent |
| 6. | UPVC pipes | : | Kissan/Supreme or equivalent |
| 7. | S.W.G.pipes | : | Indo or equivalent |

SAFETY CODE

Suitable scaffolds should be provided for workman for all the works that cannot safely be done from the ground or from solid construction, except in cases of short duration works, which can be done safely from ladders. When a ladder is used, an extra mazdoor shall be engaged for holding the ladder and if the ladder is used for carrying materials as well, it shall be of rigid construction made either of good quality wood or steel. The steps shall have a minimum width of 450mm and a maximum rise of 300mm. Suitable foot and hand holds of good quality wood or steel shall be provided and the ladder shall be given an inclination not steeper than 1 in 4 (1 horizontal to 4 vertical).

Scaffolding or staging more than 300mm above the ground or floor, swung or suspended from an overhead support, shall be erected with stationery supports and shall have guard rails properly attached, bolted, braced and otherwise secured and atleast 900mm high above the floor or platform of such scaffolding or staging and extending along the entire length of the outside and ends there of with only such openings as may necessary for the access of persons and delivery of materials. Such scaffolding or staging shall be so fastened as to prevent it from swaying from the building or structure.

Working platform, gangways and stairways should be so constructed that they should not sag unduly or unequally and if the height of the platform or the gangway or the stairway is more than 3-6m above ground level or floor level, they should be closely boarded, should have adequate width and should be suitably fastened, as described in (ii) above.

Every opening in the floor of a building or in a working platform be provided with suitable means to prevent the fall of persons or materials by providing suitable fencing or railing, whose minimum height shall be 900mm.

Safe means of access shall be provided to all working platforms and other working places. Every ladder shall be securely fixed. No portable single ladder shall be over 9 M in length while the width between side rails in ring ladder shall be in no case be less than 300mm. For longer ladders, this width should be increased atleast 6mm for each additional foot of length. Spacing of steps shall be uniform and shall not exceed 300mm.

Adequate precautions shall be taken to prevent danger from electrical equipment. At the work site, no materials shall be so stacked or placed as to cause danger or inconvenience to any person or the public. The contractor shall also provide all necessary fencing and lights to protect the public from accident, and shall be bound to bear the expenses of defence of every suit, action or other proceedings at law that may be brought by any person for injury sustained owing to neglect of the above precautions and to pay damages

and costs, which may be awarded in such suit, action or proceedings to any such persons or which may with the consent of the contractor be paid to compromise any claim by any such person.

I. **Excavation and Trenching:**

All trenches, 1.2m or more in depth, shall at all times be supplied with at least one ladder for each 30m in length or fraction thereof. Ladder shall be extended from bottom of the trench to at least 900mm above the surface of the ground. The side of the trenches which are 1.5m or more in depth shall be stepped back to give suitable slope or securely held by timber shoring, so as to avoid any danger to sides collapse. The excavated material shall not be placed within 1.5m of the edge of the trench or half of the depth of the trench, whichever is more. Cutting shall be done from top to bottom. Under no circumstances undermining or under cutting shall be done.

II. **Demolition:**

Before any demolition work is commenced and also during the progress of the work.

- a. All roads and open areas adjacent to the work site shall either be closed or suitably protected.
- b. No electric cable or apparatus which is liable to be a source of danger over a cable or apparatus used by the operator shall remain electrically charged.
- c. All practical steps shall be taken to prevent danger to persons employed, from the risk of fire or explosion or flooding. No floor, roof or other part of the building shall be so over- loaded with debris or materials, so as to render it unsafe.

III. All necessary personal safety equipments as considered adequate by the Architects should be kept available for the use of the persons employed on the site and maintained in a condition suitable for immediate use and the contractor should take adequate steps to ensure proper use of equipment by the concerned.

- a. Workers employed in mixing asphaltic materials, cement and lime mortars shall be provided with protective footwear and protective gloves.
- b. Those engaged in white washing and mixing or stacking of cement bags or any materials which is injurious to the eyes shall be provided with protective goggles.

- c. Those engaged in welding works shall be provided with welder's protective (eye) shields.
 - a. Stone breakers shall be provided with protective goggles and protective clothing and seated at sufficiently safe intervals.
- e. When workers are employed in sewers and manholes, which are in use, the contractor shall ensure that the manhole covers are opened and are ventilated atleast for an hour before the workers are allowed to get into the manhole and the manholes so opened shall be cardoned off with suitable railing and provided with warning signals or boards to prevent accidents to the public.
- f. The contractor shall not employ men below the age of 18 years and women on the work of painting with products containing lead in any form. Wherever men above the age of 18 years are employed on the work of lead painting, the following precautions should be taken.
 - i) No paint containing lead or lead products shall be used except in the form of paste or ready made paint.
 - ii) Suitable face masks should be supplied for use to the workers when paint is applied in the form of spray or a surface having lead paint is rubbed and scrapped.
 - iii) Overalls shall be supplied by the contractors to the workers and adequate facilities for washing shall be provided to the working painters during and on cessation of work.
- IX. When the work is done near any place, where there is risk of drowning, all necessary equipment should be provided and kept ready for use and all necessary steps taken for prompt rescue of any person in danger and adequate provisions should be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.
- X. Use of hoisting machine and shackle including their attachments, in charge and supports shall conform to the following standards or conditions.
 - 1.a. These shall be of good mechanical construction, sound material and adequate strength and free from any patent defects and shall be kept in good working order.
 - b. Every rope used in hoisting or lowering materials or as a means of suspension shall be of durable quality and adequate strength and free from patent defects.

2. Every crane driver or hoisting appliance operator shall be properly qualified and no person under the age of 21 years should be in charge of any hoisting machine including any scaffolding or give signals to the operator.
3. In case of every hoisting machine and of every chain, ring hook, shackle swivel and pulley block used in hoisting or lowering or as means of suspension, the safe working load shall be ascertained by adequate means. Every hoisting machine and all gear referred to above shall be plainly marked with the safe working load. In case of a hoisting machine having a variable safe working load, each safe working load and the condition under which it is applicable shall be clearly indicated. No part of any machine or any gear referred above in this paragraph shall be loaded beyond the safe working load except for the purpose of testing.
4. In case of departmental machines, the safe working load shall be notified by the clients. As regards contractor's machines the contractor shall notify the safe working load of the machines to the s, whenever he brings any machinery to site of work and get it verified by the s.
- XI. Motors, gearing, transmission, electric wiring and other dangerous parts of hoisting appliances should be provided with efficient safeguards. Hoisting appliances should be provided with such means as will reduce and minimise the risk of accidental descent of loads. Adequate precautions should be taken to reduce to the minimum risks of any part of a suspended load becoming accidentally displaced. Sleeves and boots as may be necessary should be provided, whenever workers are employed on electrical installations. The workers should not wear any rings, watches and carry keys or other materials, which are good conductors of electricity.
- XII. All scaffolds, ladders and other safety devices mentioned or described herein shall be maintained in safe condition. No scaffold, ladder, or equipment shall be altered or removed while it is in use. Adequate washing facilities should be provided at or near place of work.
- XIII. To ensure effective enforcement of the rules and regulations relating to safety precautions, the arrangements made by the contractor shall be open to inspection by the clients or the Architect.
- XIV. These safety provisions should be brought to the notice of all concerned by display of a notice board at a prominent place of the workspot. The person, responsible for compliance of the safety code, shall be named therein by the contractor.
- XV. Notwithstanding the above clauses for (i) to (xiv), there is nothing in these to exempt the contractor from the operation of any other Act or Rules in force in the Republic of India.

INSURANCE COVER

The contractor shall at his own expense take comprehensive all risk (C.A.R) insurance policy before starting the work at site. Such policy shall be continued till the entire work is completed by the contractor.

The C.A.R. insurance policy should cover damages to and loss of property and persons as under:

- a. Building under construction – full reinstatement value against all risks during construction.
- b. All types of injury including fatal to all workers belong to contractors own or sub-contractors organisation to be covered under workmen compensation act.
- c. All types of injury including fatal to employees of the employer and architect, connected with the work.

Insurance in respect of damage to persons and property:

The contractor shall be responsible for all injury to persons, animals or things and for all damages to the structural and/or decorative part of property which may arise from the operations or neglect of himself or of any sub contractor for any of his or a sub-contractors employee, whether such injury or damage arise from carelessness, accident or any other cause whatever in any way connected with carrying out his contract. This clause shall be held to include inter alias any damage to buildings whether immediately adjacent or otherwise and any damage by frost, rain or other inclemency of the weather to roads, street, foot paths, bridges as well as all damages caused to the buildings and the works forming the subject of this contract. The contractor shall indemnify the employer and hold him harmless in respect of all and any expenses arising from any such injury or damage to persons or property as aforesaid and also in respect of any claim made in respect of injury or damage under any acts of Government or otherwise and also in respect of any award of compensation or damages consequent upon such claims.

The contractor shall reinstate all damages of every sort mentioned in this clause, so as to deliver the whole of the contract works complete and perfect in every respect and so as to make good or otherwise satisfy all claims for damages to the life/property of third parties.

The contractor shall indemnify the employer against all claims which may be made against the employer by any member of the public or other third party in respect of any thing which may arise in respect of the works or in consequence thereof and shall at his own expense arrange to effect and maintain until the virtual completion of the contract, with an office approved by the Employer, a policy insurance in the joint names of the Employer and the contractor against such risks, and deposit such policy or policies with the Architect from time to time during the currency of this contract. The contractor shall also indemnify the employer against all claims, which may be made upon the Employer whether under the workmen's compensation act or any other statutes in force during the currency of this contract or any common law or under any award, decision, order, decree, finding or judgement of any labour or Industrial court or tribunal or authority or of any court of law in respect of any employee of the contractor or any sub-contractor and shall at his own expense effect and maintain until the virtual completion of the contract with an approved office a policy of insurance in the joint names of the employer and the contractor against such risks and deposit such policy/policies with the employers from time to time during the currency of this contract. The contractor shall be responsible for any thing, which may be excluded from the insurance policies above referred to, and also for all other damages to any life/property arising out of and incidental to the negligence or inefficient carrying out of this contract.

He shall also indemnify the employer in respect of any costs, charges or expenses arising out of any claim or proceedings and also in respect of any award of compensation for damages arising there from. The Employer shall be at liberty and is hereby empowered to deduct the charges, the expenses, arising or occurring from or in respect of any such claim or damage from any sum or sums due or to become due to the contractor.

Fire Etc. Insurance:

The contractor shall on signing the contractor insure the works and keep them insured until the virtual completion of the contract against loss, or damage by fire and/or earthquake in an office to be approved by the Employers in the joint names of the Employer and the contractor, the name of the employer being placed first in such policy. This shall be in the form of open general policy for the full value of the works, the premium payable thereon being for the amount of work actually constructed for the time being, the premium increasing with the increase in the value of work. Such policy shall cover the property of the employer only and shall not cover any property of the contractor or of any sub-contractor or employees.

The contractor shall deposit the policy and original premium receipts with the employers within 21 days from the date of signing of the contract.

In default of the contractor insuring as provided above the employer on his behalf may so insure and may deduct the premiums paid from any sums due or which may become due to the contractor. The contractor shall as soon as the claim under the policy is settled or the work reinstated by the insurance office, should they elect to do so, proceed with all due diligence with the completion of the work in the same manner as though the fire/ rise

had not occurred and in all respects under the same conditions of the contract. The contractor, in case of rebuilding or reinstatement after fire etc., shall be entitled to such extension of time for completion as the Architects may deem fit.

LABOUR LAWS AND RULES

The Site Engineer shall ensure that the contractor maintains relevant records and fulfils all conditions and requirements in accordance with

- a. The payment of Wages Act
- b. Employer's Liability Act
- c. Workmen's Compensation Act
- d. Contract Labour (Regulations & Abolition) Act 1970 and Central Rules 1971.
- e. Apprentices Act 1961.
- f. Any other Act or enactment relating thereto and rules framed thereunder from time to time.

The Site Engineer shall refrain from involving himself and the supervisors under him by comments/advice/attempts at mediation in any kind of labour dispute at site. His job is only to report to his superiors any happenings of the this sort in an objective manner.

EMPLOYER'S RESPONSIBILITY – CONTRACT LABOUR (REGULATIONS AND ABOLITION) ACT 1970 AND RULES 1971

With a view to ensuring that the provisions of the Act are not contravened, the Site Engineer should give particular attention to the following points and see that all the provisions of the Act are enforced:

1. Principal Employer (Employers) is registered as per the Act.
2. Contractor holds a licence under the Act from the Local Labour Commissioner for the appointment of Contract labour.
3. Required notice boards, registers and records as provided in section 29 of the Act are maintained by the contractor.
4. Payment of proper wages as per the rules are effected within the prescribed time limits by the contractor.

5. Prescribed facilities and amenities are provided by the contractor.
6. Proper efforts are made by the contractor to set right contravention of law, as soon as the notice pointing out the same is received from the Labour Enforcement Officer, and reports “on action taken” are sent to the Labour Enforcement officer at the earliest with copies to the Employer.