

SCHEDULE "A"

SCHEDULE OF RATES AND APPROXIMATE QUANTITIES

(a). The quantities given here are those upon which the lumpsum tender cost of the work is based but they re subject to alternations omissions, deductions or addition as provided for in the conditions of this contractor and do not necessarily show the actual quantities of work to be done. The units rates noted below are those Governing payment for extras or deductions or omissions according to the condition of the contract, as set forth in the preliminary specification of the TAMILNADU BUILDING PRACTICE and other conditions or specifications of the contract.

(b) It is to be expressly understood that the measured work is to be taken not (not with standing) any custom or practice the contrary according to the actual quantities when in place and finished according to the drawings or as may be ordered from time to time by Project Engineer and the cost calculated by measurement or weight at the respective prices, without any additional change for any necessary or contingent works connected therewith. The rates quoted are for works in site and complete in every respect.

Item	Probable quantity	Description of work	T.N.B.P. No.	N.B.C No.	RATE (in works & figures)	UNIT (in works & figures)	Amount in figures.
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Vide separate sheet enclosed

Note : the second sub division of this column (i.e. column 3) is for entering description in words such as number, cubic metre, Running meter, Square metre, Kg, etc.,

Issued to M/s. Thiru
..... Pages and with plans

Tenderer/ Contractor

**PROJECT ENGINNER, TTDC
Chennai-600 002**

LIST OF DRAWINGS

Note : All drawings to be signed by the Tenderer/Contractor
as well as the officer entering in to contract

Supplemental list
As entered to in the specification of
The TAMILNADU BUILDING PRACTICE

Sl. No. 1.	Drawing No. 2.	Description 3.	S.No. 1	Drawing No. 2.	Description 3.	Date on which drawing was

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Annexure

PARTICULARS TO BE FURNISHED BY THE TENDERER

1. Name of the Tenderer and address
2. Name of work
3. Date of tender
4. Total value of tender
5. Details about EMD enclosed for this tender and its validity
6. Registered class of the Tenderer in PWD and TTDC with monetary limit
7. Recent works executed (details about name and place of work, value of work etc. should be furnished)
8. Works under execution (details about name and place of work value of work etc. should be furnished)
9. Command of labour in brief
10. Turnover of previous year (particulars for period of three consecutive years to be furnished).
11. Whether income tax clearance certificate is enclosed if not when it will be produced.
12. (i). Sales tax registration No.
(ii). Whether sales tax verification certificate is enclosed. If not when it will be produced.
Whether income tax clearance certificate is enclosed if not when it will be
13. In case of registered co-operative societies they should furnish name for the nominee with their credentials details at the time of tender itself. They should also certify that the nominee of the society is not a registered contractor in the Department.
14. Technical Assistant details
 - (i). Name
Qualification certificate
Experience certificate
 - (ii). Name
Qualification certificate
Experience certificateOr
Name
If retired civil Engineer Designation
And date of retirement (copy may be enclosed)
15. If any other details.

Note: The consent letter from the Technical Assistant proposed to be employed should be furnished and enclosed with the tender

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FOR SPECIAL ATTENTION OF THE CONTRACTOR

1. Proof of registration in PWD, as a contractor shall be attached with the tender.
2. Current income tax clearance certificates shall be enclosed with the tender.
3. EMD will be received in the shape as detailed in Sl. No.4 of tender notice.
4. Security deposit should be in the form of National Savings certificates / Demand Draft in the name of TTDC Chennai – 600 002.
5. The following particulars shall also be furnished by the contractor with the value.
 - a. List of details of works executed by the contractor with the value.
 - b. Annual turn over of the contractor for the last five years. Necessary certificates to the effect issued by the respective bank shall be attached
6. The lower / lowest tenderer when informed that his tender is under consideration shall have to furnish PERT chart in the proper form within a week from the date of receipt of letter calling to PERT chart. The pert chart should conform with departmental time schedule for the completion of the work furnished in the tender notice. If the pert chart is not received with a week from the date of receipt of communication his tender will not be considered.
7. The tender document will be issued only to the contractors who have registered their names as contractors in PWD in the appropriate class and in live register of PWD as on Tender date and incase of pre-qualification tender, the tender document will be issued to the pre-qualified contractors only

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SPECIAL INSTRUCTIONS TO THE TENDERERS

1. The tenderer should carefully go through the schedules and quote their rates for all items.
2. The rates should be filled neatly in figures and in words and taking into account the metric unit specified in the tender Scheduled, scrapping, over writing, scribbling and erasing should be avoided as far as possible.
3. The amount for each item of work should be worked out and furnished. Proper care must be taken in working out the amount of each item of work taking into account unit for which the rate is quoted and the quantity of work to be done under the item.
4. The total of each page should be noted at the end of each page and carried over to ever page and the grand total value of work should be worked out and shown at the end.
5. The tender should be submitted along with a covering letter giving full details as stated in the tender notice.
 - i. Details of the earnest money depot as per details in item No.4 of tender notice
 - ii. Income tax clearance certificate for the current year should be submitted along with the tender.
 - iii. Details of previous works done by the tenderer covering the cost of work the agreement amount and date, the Department in which the work was carried out etc. so as to asses the previous experience of the tender, end also make an easy reference to their record of work. Year wise details should be furnished so as to see that those tenderers have minimum experience of major buildings.
 - iv. List of various machinery and other equipment at the tenderer's disposal for use in the execution of work.
 - v. The tender forms should be filled in while submitting the tender. The tenders submitted without filling up the tender form are liable to be rejected.
 - vi. The tenders must be submitted in a fullscape cover there by duly signed all the conditions, plans and schedules issued as tender document.

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**EMPLOYMENT OF TECHNICAL PROFESSIONAL
(Based on this value of contract)**

1. UptoRs.5.00 lakhs	1. One diploma holder in civil Engineering (or) 2. Not less than one retired Junior Engineer
2. From Rs.5 to 10 Lakhs	1. One B.E. (Civil) or 2. Equivalent degrees holder or 3. Not less than one retired sub-Divisional Officer / Assistant Project Engineer or ADE
3. From Rs.10 to 25 Lakhs	1. One B.E. (Civil) with 3 years experience plus one diploma holder in Civil Engineer (or) 2. Equivalent degree holder with 3 years experience plus one diploma holder in civil Engineering. 3. Not less than one retired sub-Divisional Officer plus one diploma holder in Civil Engineer. 4. Two diploma holders in Civil Engineer with 3 and 5 years experience respectively.
4. From Rs.25 to 30 Lakhs	1. One B.E. (Civil) with 3 years experience plus one diploma holder in Civil Engineer (or) 2. One B.E. (Civil) with 3 years experience plus two retired Junior Engineers (or) 3. Equivalent degree holder with 3 years experience plus two diploma holder in civil Engineering / two retired Junior Engineers.(or) 4. One retired sub-Divisional Officer / AEE / ADE plus two diploma holder in Civil Engineer. (or) 5. One retired sub-Divisional Officer / AEE / ADE plus two retired Junior Engineers.
5. Above Rs.50 Lakhs.	

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- a. A penalty of Rs.2000/- per month for diploma holders and Rs.5000/- per month for degree holder is levied in case of default on the part of contractors in following the norms laid down above.
- b. The employment of technical Assistants could be based only on value of contract. Engineers with Mechanical Engineer qualification and retired from Civil Engineer Departments are also suitable to supervise the Civil Engineering works because of their experience in Civil Engineer field.

It will not be incumbent on the part of the contractor to employ technical Assistants when the work is kept in abeyance due to valid reasons and if during such period in the opinion of the Project Engineers, the employment of Technical assistant if required for the due fulfillment of the contract, should be made.

- c. In case of contract who is professionally qualified is not in position to remain always at the site of the work during working hours personally checking all items of work and paying extra attention of the works as may demand special attention (e.g.) RCC work etc. he should employ technical qualified person s prescribed for the work.
- d. The contractors who possess a degree in Mechanical or Civil Engineer may also have to appoint Technical Assistants in case of Registered Contractors with degree in Electrical Engineering when they are entrusted with civil works by the Department.
- e. Engineers with Mechanical Engineering qualification and retired from Civil Engineering Department are also suitable for supervising the Civil Engineering works subject to condition that evidence for experience in Civil Engineering filed is produced.
- f. One technical Assistant may be employed by the contractor for more than one work situated within one kilometer provided that monetary limit prescribed for the nature of Technical Assistants to be employed is adhered to by one and the same contractor.

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9. A tenderer submitting a tender which the tender accepting authority considers excessive and or indicative in sufficient knowledge of current prices or definite attempt at profiteering will trended himself liable to be debarred permanently from tendering or for such period as the tender accepting authority may decide. The tender rates should be based on the controlled price for materials, if any fixed by Corporation or the reasonable price permissible for the tenderer to charge 3 private purchaser under the provisions of clause 8 of the Hoarding profiteering Preventions ordinance 1943, as amended from time to time on similar principles in regard to labour and supervision in the construction.

20. The contractor should offer employment to ex-toddy lappers as far as possible. The number of ex-toddy lappers to whom he can so offer employment should be mentioned in the tender and he should undertake in the agreement to offer such employment to such number.

21. The contractors shall comply with the provisions of the Apprentices, Act 1961 and the rules and orders issued there under from time to time. If he falls to do so, his failure will make breach of contract and the competent authority, may at his discretion, cancel the contract, of invoke any of the penalties for the breach of contract provided in the conditions of the contract. The contractor shall also be liable for any penalty, liability arising on account of any violation by him of the provision of the Act.

Without prejudice to the above clause the contractor shall during the period of the contract when called upon by the Engineer, incharge engage and also ensure engagement by the sub-contractors and other employees by the contractor in connection with the work, such number of apprentices in all categories for such period as may be required by the Engineer-in-Charge.

22. In the case of contracts for construction of buildings, either permanent of semi permanent buildings a sum of equivalent to 2 ½ % of the value of work done will be retained for the period of one year from the date of completion of work in order to enable the department officers to watch the effect of all seasons on the work done by the Contractor. The amount so retained with the Corporation will be refunded only on the expiry of one year period referred to above and on execution of indemnity bond by the contractor for a further period of four years. The contractor shall be liable to set right all defects arising out of this faulty execution or substandard work noticed during the above five years period at his cost.

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23. A movement register should be opened and maintained, for technical Assistants by the contractor or for the technical qualified contractor. The technical assistance or technically qualified contractor should note the arrival and the departure timing every day along with initials. Such register should be produced during inspection of the inspecting officers.

24. The fact of submitting the tender implies that the tenderers have actually inspected the site of work and have examined before tendering the nature and extent of various kinds of soils at various depth and have based their tender in such examination by them and no future representation in this regard will be considered.

25. A statement giving brief particulars of equipment and resources that will be put at the disposal of the work under the following classifications should accompany the tender.

- A. Equipment (Transport for materials viz. Lorries and carts, concrete mixtures)
- B. Organisation (i). Technical, (ii). Unskilled.
- C. Resources of materials like teakwood etc. and extent to which department help is required top procurement of materials and transport of the same.
- D. Methods that will be adopted to speed up the work to ensure completion within or less than the time fixed for completion.

26. The tenderer of the contract who agree to employ the maximum number of ex-service men (Number to be specified in the tender) will receive preferential consideration. The tenderers are requested to report on their covering letter.

27. In registered PWD contractors who had not already produced live certificates in the current year also should do so.

28. All rates quoted in the tender shall be inclusive of sales tax payable under the General sales tax act as amended from time to time (including amendment, Act 28/84) and that the contractor is responsible to file the sales tax return and pay the amount as amended by the C.T. Department. No request for payment of sales ax separately in addition to tendered rates due to any plea of subsequent levy increase in tax will be entertained vide clause 38 (2) of General contains to contract.

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TENDER

To

Managing Director,
Tamilnadu Tourism Development Corporation,
Chennai-600 002.
Sir,

I/We do hereby tender and if this tender be accepted, undertake to execute the following work viz.....

As shown in the drawings and described in the specification deposited in the office of the Project Engineer, Tamilnadu Tourism Development Corporation., Chennai-600 002. With such variation by way of alternations or additions to and omission from the said works and method of payment as are provided for in the "Conditions of contract" for the sum of Rupees or such sums as may be arrived at under the clause of the "General condition to contract" relating to payment on lumpsum basis or by final measurements at unit prices.

2 (i) . I/We have also completed the price list of item schedule "A" annexed (in words and figures) for which I/We agree to execute the works and receive payment on measured quantities as per the General conditions of the contract.

3. I/We do hereby distinctly and expressly declare and acknowledge that before the submission of my / our tender. I / We carefully following the instructions in the tender notice and have read the Tamilnadu Building Practice addenda volume and that. I/We have made such examinations of the contract documents and of the plans, specifications, quantities and of the location where the said work is to be done and such investigation the work required to be done and in regard to the materials required to be furnished to enable me / us to thoroughly understand the intention of the same and the recruitment covenants stipulations and restricts We will not thereafter make any claim or demand upon the Corporation based upon or arising misunderstandings or misconception of mistake or my / or part of the said requirements and covenants stipulations and conditions.

4. I/We enclose an income tax verification certificate. I/We being registered Public Works Department contractor. I/We have already produced an income tax verification certificate during the current year in respect of (here particulars of the previous occasion on which the certificate was produced should be gin). The legal address of the contractor for service of all letters of notices will be as follows

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5 (i). (a) I / We enclose herewith for the payment of the sum of Rs..... As Earnest money not to bear interest.

5. (i). (b). In lieu of cash deposits, I / Wehave enclosed a certificate bearing No..... Date..... issued by for a value Rupees only) drawn / endorsed / pledged in favour of the Project Engineer,

5 (i) (c) I am / We are And hence exempted from payment of E.M.D.

6. If my / our tender is not accepted this sum shall be returned to me / us on my / our application. When intimation sent to me / us of rejection or at the expiration of ninety days from date of this tender whichever is earlier, if tender is accepted, the EMD shall be retained by the Corporation as security for the due fulfillment of the contract. If upon written intimation being given to me / us by the authority authorized by the Government under the Article 299(i) of the constitution. (Here in after called "the accepting authority") of acceptance of tender. I / we fail to make the additional security deposit then I/We agree to the forfeiture of the EMD. Any notice required to be served on me / us if delivered to me / us personally or forwarded to me / us by post (registered or ordinary) or left at my / our address given herein. Such notice shall if sent by post be deemed to have been serviced on me / us at the time when in due course of post it would be delivered at the address to which it is sent.

7. I / We fully understand that on receipt of communication of acceptance of tender from the accepting authority there emerges a valid contract, between me / us and the Managing Director, Tamilnadu Tourism Development Corporation Tamilnadu and Tender documents (i.e.) tender notice tender with schedule general condition to the contract, and special condition of the tender negotiation letter communication of acceptance tender shall constitute the contract for this purpose and be the foundation of rights as defined in, clause IV of tender notice, provided that it shall be open to the accepting authority to insist on execution any written agreement by the tenderer. If administratively considered necessary or expedient.

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8.I / We have also signed the copy of Tamilnadu Building Practice and National Building Code and addenda volume there to maintained in the office of the Project Engineer, Tamilnadu Tourism Development Corporation, Chennai- 600 002. in acknowledgement of being bound by all conditions of the clauses of the general conditions to be contract and all specifications for items of works described by the specification number in Schedule (A).

9. In consideration of the payment of Rs..... or such sum as may be arrived at under the clause of the General condition to the contract relating to the payment on lumpsum basis or by final measurements at unit prices, I/We agree subject to the said condition to execute and complete the works shown upon the said drawing serially number from 1 to inclusive of (schedule B) and described in the specifications (Schedule C) and to the extent of probable quantities shown in (Schedule A) with such variation by way of additions to or alternations, deductions from, the said work and method of payment therefore as are provided for in the said conditions.

10. the term Project Engineer in the said condition shall mean the PWD officer incharge of the Division having jurisdiction for the time being over the work, who shall be competent to exercise all the powers and privileges reserved, herein, in favour of Corporation with the previous sanction of a subject to ratification by the competent authorities in case, where such sanction of ratification may be necessary and who has been duly authorized under article 299 (i) of the constitution.

11. I / We agree that the time shall be considered as the "Essence of this contract" and to commence the work as soon as this contract is accepted by the competent authority as defined by the Tamilnadu PWD code and the site or premises is handed over to me / us as provided for in the said condition and agreed to complete the work within Months from the date of such handing over of the site or premises and show progress as defined in the tabular statement. "Rate of progress" subject nevertheless to the provision for extension of time contained in clause 56 of the general conditions to the contract appendix to the Tamilnadu Building Practice.

12. I / We agree that upon the terms and conditions of this contract being fulfilled and preformed to the satisfaction of the Project Engineer, the security deposited by me / us herein before recited of such portion thereof as I / We may be entitled to under the said conditions be paid back to me // us as provided in clause 64 of General condition to the contract.

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13. I am / we are professionally qualified and my / our qualifications are given below.

Name	Qualification and Experience

I / We in pursuance of clause of tender notice undertake to employ the following technical staffs for supervising the works and will see that one of them is always at site during working hours personally checking all items of works and paying extra attention to such works as may required special attention (eg.) reinforced cement concrete works.

Name of technical staffs proposed to employed	Qualification and Experience

Note : a. The last two clauses should be score out if the cost of work involved is less than Rs.1.00 lakh.

b. The tenderers should score out the last clause if they themselves, are professionally qualified or undertake to employ technical staff under them.

14. I / We agree that the arbitrator for fulfilling the duties set forth in the arbitration clause of the general condition to contractor shall be.

(i). The Project Engineer, Tamilnadu Tourism Development Corporation., Chennai-600 002 incase of any claim.

(ii) I / We agree that in case of any value of claim, the remedy will be through the competent civil court only.

Signature of the contractor
With full addressed with
Name in block letters.

Tenderer/ Contractor

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SALES TAX REGISTRATION & DEDUCTION OF SALES TAX FROM BILLS

The tenders could be required to indicate their registration number under the Tamilnadu General Sales tax Act 1959 in the tender form and produce sales tax clearance certificate issued by the Commercial Tax department before final settlement of bills.

According to the notification issued by the Commissioner of sales tax Chennai with regard to "Deduction of Sales tax at source in respect of works contractor in the TAMILNADU GOVERNMENT GAZETTE CHENNAI, dated 31.05.1999, a new provision under 7F for deduction of tax at sources is introduced in the Tamilnadu General Sales tax Act 1959 by Tamilnadu Act 15 of 1999 with effect from 10.06.99. as per this new section, 7F of this act at the time of payment of such sum deduction @ 2% (Two percent) in respect of civil works and 4% (Four percent) in respect of all other works contractor from the total amount payable to the contractors and the amount so deducted shall be deposited to the Assessing officer concerned within "SEVEN" days.

FOR CONTRACTORS SPECIAL ATTENTION

1. Only Clean River sand shall be used in all cases.
2. Only clean fresh water shall be used on the work. The contractor shall make his own arrangements for water and shall meet all charges therefore. The special attention of the Contractor is drawn to clause 39 of preliminary specification of the T.N.B.P. regarding water and lighting.
3. The broken stone for concrete and RCC work shall be granite and passed by the Project Engineer.
4. All iron work or steel work of every kind such as to be embedded in concrete shall immediately on arrival at the site be properly scrapped and wire brushed and given priming coat of approved lead painting without claims for extra.

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5. The iron holdfasts shall be buildup on the walls in cement mortar 1:3 at the time of construction of walls. No extra claim shall be due for the same wherever the holdfasts are to be provided to 9" thick wall. Those should be fixed with cement concrete 1:3:6 using 20mm gauge broken granite stone jelly for proper anchorage and proper biding. No separate for such pockets of concrete filling at masonry along with adjacent masonry.
6. The Teakwood shall be best Indian Teakwood only and shall be subject to inspection and approval by the Project Engineer before use on work. Country wood where specified shall be "Karimarudhu" or "Kongu" for scantling "Aiyini" for planks.
7. Holes for Electric, wiring, water supply and drainage's etc. shall be provided as directed during progress of work without any claim for extra.
8. The work will be carried out with the lest hindrance to the adjoining building and the contractor will be responsible for the damages caused to the existing fixtures, electric fittings etc. the course of execution and the contract shall make good nay damages without any claim for extra.
9. In the case of "T" beams and "L" beams the quantity given in the schedules is the quantity for rib portion only. The top flange portion will be always measured with the general slab portion and paid for a the slab rate only. For all RCC works, the rate shall be include the treatment of bearing as per TAMILNADU BUILDING PRACTICE CODE.
10. Concrete works : All exposed concrete surfaces will be required to be finished by cement plaster as detailed in Schedule "A".
11. Plastering all external corners, edges of beams, edges of doors and windows openings etc. shall be finished sharp using richer mortar and also finished truly vertical or horizontal as the case may be. The rate for plastering shall include the cost of finishing as above and no separate extra for the corners, edges beams etc shall be paid.
12. If rates are not separately called for, for similar items of works in difference floors, the contractor should not that one rate is applicable for all floors indicated in the detailed plans. Any claims for extra for such items floor war will not be entertained under any circumstances.

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13. The project if any to the masonry will be measured under the relevant items and non extra will be paid for finishing the same.

14.(i). The work in Public Works Department (Buildings) executed by the contractor under the contract shall be maintained by the contractor until the work is taken over by the Project Engineer. The contractor shall accordingly arrange his own insurance against fire, flood, volcanic eruption, earth quake other convention of nature and all other natural calamities risk arising out of acts of God during such period and that the **corporation** shall not be liable for any loss or damages occasioned by or arising out of any such acts of God.

14.(ii). Provided, however that the contract shall not be liable for all or any loss or damages occasioned by or arising out of act of foreign enemies, invasion hostilities or war like operation (before or after declaration of war, riots, natural calamity or usurped power.)

RETENTION OR WITHHELD AMOUNT

14.(iii). 21/2% of the total value of the work will be retained in the final bill of the work for the period one year reckoned from the date of completion of the work in the order to enable the department to watch the effect of all seasons of the work. The contractor should furnish an indemnity bond for further period of four year. If any defects are notified in the above said period the defects should be rectified by the contractor at his own costs as directed by the Departmental Officers and no extra payment be made for the rectification of such work.

REVENUE RECOVERY ACT

14.(iv). Whenever any amount has to be paid by the contractor in lieu of determination of the contract by virtue of clause 57 (4) any amount that may be due or may be come due from the contractor under the presence and the contractor is not responding to the demands for the payment of said amount, then the Corporation shall be entitled to recover the said amount under the provision of the Revenue Recovery Act.

In the event of the work being transferred to any other Division/Project Engineer / Assistant Executive Engineer who is in charge of Circle / Division / Sub Division having jurisdiction over the work shall be component to exercise all the powers and privileges reserved in favour of Corporation.

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RISK INSURANCE

14 (v). The work executed by the contractor or under this contract shall be maintained by the contractor's risk until the work is taken over by the Project Engineer. The Corporation should not be liable to pay for any loss or damages occasioned by (or) arising out of fire, flood, volcanic eruptions, earth quake, other conclusion of nature and all other natural calamities, risk arising cut of act of God during such period and that the option whether to take insurance coverage (or) not to care such risks is left to the contractor.

The contractor shall not be liable for all or any loss of damages occasioned by or arising out of acts for foreign enemies, invasions, hostilities or war like operation (before or after declaration of war) rebellion military or usurped power.

ARBITRATION CLAUSE

14 (vi). In case any dispute or difference between the parties to the contract either during the progress or after the completion of the works or after determination, abandonment or breach of the contract or as to any other matter or thing arising there under except as to the matters left to the sole discretion of the Project Engineers under clause 18, 20, 25-3, 27-1, 34, 35 and 37 of the general condition of the contractor as to the with holding by the Project Engineers or the payment of any bill to which the contractor may claim to be entities. Then either party shall forth with give to the other, notice of such dispute or difference and such dispute or difference shall be and is hereby referred to the arbitration of the Special Chief Engineer, PWD., Buildings Construction and Maintenance Circle, Chennai-5 (Mentioned in the "Articles of agreement" (here in after called the arbitrator) in case where the value of claim is less than and upto Rs.50,000/- (Rupees fifty thousand only)

In case where the value of the claim is more than Rs.50,000/- the parties will seek remedy through the competent civil court (G.O. Ms. No.253, PWD., dated 24.02.1981.

14 (vii). If at any subsequent to the execution of this agreement, Corporation materials other than those specified in the agreement are supplied to the contractor for use of the work, they will be charged at the market value prevailing at the time of writing of the charge and the should intimate in writing the rate which he demands for finish the work in view of the fact that he is to use Corporation materials. No centage of incidental charges will be borne by the Corporation in connection with the supply of the materials referred to in this paragraph.

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ADDITIONAL SPECIFICATION

1. The arrangements of M.S. rods for all RCC works shall be in accordance with the working drawing supplied.
2. (i). Payments for centering works for all RCC items shall be made only after the concrete is laid, even though separate items for centering works are included in the schedule. The centering and form shall be provided to the extent and area ordered by the Project Engineer during execution.
(ii). all cement concrete for RCC works shall be machine mixed and vibrated.

(ii). All lime mortar shall be ground in mortar will be as per TNBP
3. M.S. steel rods should be cut and placed as reinforcement with proper care according to the available rods at site, so as to ensure the minimum possible wastage. The maximum percentage of wastage of permissible in any size of reinforcement rods shall be of 5% which will be charged on at the issue rate of Steel.

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SCHEDULE C

List of specification for the various item of work supplementing those prescribed in Schedule "A" by standard specification Number.

1. The contractor shall be employ the following technical staff for supervising the work and shall see that one of the is always at site, during working hours personally checking all items of work and paying extra attention to such works as may demand special attention (eg.) reinforced concrete work etc.

Name or Member of the technical staff to be employed	Qualification	Experience

Note 1 : In the case, the contractor is himself professionally qualified is not in position to remain always at the site for the work during working hours, personally checking all items of work and paying extra attention to such works as may demand special attention (i.e..) RCC work, etc, the contractor should employ technically qualified men and as prescribed for the work.

Note 2 : A penalty of Rs.2000/- (Rupees two thousand only) per month for diploma holder and Rs.5000/- (Rupees five thousand only) per month for degree holder will be levied in case of default of the part of contractor as per the norms specified regarding appointment of Technical Assistant with tender notice.

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ADDITIONAL CONDITION – 1

1. The materials noted in the list enclosed will be supplied departmentally at the section stores at site of work and their cost recovered from the contractor's bill issue rates noted against each.
 2. The contractor shall be responsible for the safe custody and storage of the materials under dry conditions at the places of the work spot approved by the Project Engineer.
 3. No royalty shall be charged where due for materials quarried from PWD or District Board or other Corporation Quarries. Necessary assistance will be given to the Contractor by the PWD to obtain access to quarries approved by the Project Engineer. No plot rent shall be charged for materials stacked on the Corporation land during the course of construction, provided, all such materials are removed with a month after the work is completed.
 4. The contractor shall pay royalty or charge due for use of private quarries and private land.
 5. The contractor shall form his own approach road to the work site for which no extra will be due to him. On completion of work, the contractor shall not be permitted to remove the materials laid for formation of road. If the contractor is allowed to use the existing road, he shall maintaining them in good condition at this own cost throughout the period of the contract.
1. (1) any surplus materials remaining at the site, will not generally be taken over by the Department whether before or after the completion or termination of contract. Such materials either which were originally procured by the contractors were issued to them by the department and charged to their accounts are the property to the contractors and can however be taken by the Department is required, for use on other works, which are in progress only, be special arrangements and at the prevailing market rates viz. The rates which the article or articles of a similar description can be procured at a given time at the store, godown, from Public market suitable to the Division for obtaining such there of.
 2. If the materials originally used by the Department the price allowed to the contractor on re-acquisition shall not exceed the amount charged to the contractor excluding the element of storage charges if any.

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3. If at any time subsequent to the execution of this arrangements, Corporation materials other than those specified in the agreement are supplied to the contractor for use on the work they will be charged at the market value prevailing at the time of supply or stock issue rates whichever is higher. The contract will be informed in writing of this charge and he should intimate in writing the rate he demands for finishing the work in view of the fact that he is not to use Corporation materials. No centage or incidental charges will be borne by the Corporation in connection with the supply of materials referred to in this paragraph. 5
4. The surplus materials which were originally issued to the contractor back to the department for use of the work shall not be removed from the site of work without getting the written permission of the Project Engineer.
7. The contractor's special attention is invited to clause 37 and 38 of the preliminary specification of T.N.B.P. and he is requested to provide at his own expenses shed, latrine and Urinal for his workmen.
8. If night work is required to fulfill the agreed rate of progress all arrangements shall be made by the contractor including of lighting without any claim for extra.
9. The contractor shall not employ the labours below the age of 12 years and shall also note that he must offer employment ex-toddy tappers and unemployment agriculture labours as far as possible.
10. Any of the items in the schedule may be omitted or radically altered no variation in rates shall become payable to contractors on account of such omissions or variation in quantity.
11. Reference to TNBP in the schedule of quantities referred and addenda and corrigenda issued thereafter.
12. The contraction of building will be deemed to be completed only, if all the items of work including finishing items contemplated herein after executed.
13. The contractors shall abide the contractor's labour regulation of the PWD framed by the Tamilnadu Government.

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5. Construction materials

Supplemental to clause of 20 of General conditions.

5.1. Cement :

The contractor has to make his own arrangements for the procurement of Cement of required specifications for the works subject to the followings :-

(A). The contractor shall procure cement required for the works only from reputed cement factories (main produced of their authorised agents, manufacturing cement to ISI standard) acceptable to the Engineer-in-Charge. The contractor shall be required to furnish to the Engineer-in-Chief bills of payment and cost certificates issued by the manufactures or their authorised agents to authenticate procurement of quality cement from the approved cement factory. The contractor shall make his own arrangements for safe haulage and adequate storage of cement.

(B). The contractor shall procure in stand packing of 50Kg per bag from the authorised manufacturer. The contractor shall make necessary arrangement at his own cost to the satisfaction of Engineer-in-Charge for actual weightment of random sample from the available stock and shall confirm with the specification laid down by the Indian Standards Institutions or other standard foreign intuitions as the case may be. Cement shall be got tested for all the tests as directed by the Engineer-in-Charge atleast one month in advance before the use of cement bags brought and kept at site godown.

(C). The employer will furnish air recraing agents and admixtures required to the contractor free of cost at the employer stores. The use of such admixtures and agents shall be made as per the instructions of the Engineer-in-Charge. The cost of cartage / storage, handling, batching mixing shall be borne by the Contractor and shall be included by him to unit officers tendered for concrete

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(d). The contractor should store the cement of 60 days requirement atleast one month in advance to ensure the quality of cement to brought to site and shall not remove the same without the written permission of Engineer – in – Charge.

The contractor shall forthwith remove from the works area, and the cement that the Engineer-in-Charge may disallow for use on account of failure to meet with required quality and standard.

(E). The contractor will have to construct sheds for storing cement having capacity not less than the cement required for 9 days use, at approved locations. The Engineer – in – Charge or the representative shall have free access to such store at all times.

(F) The contractor shall further at all times satisfy the Engineer-in-Charge on demand by production of records and test books or by submission of returns and other profs as directed that the cement is being used as tested and approved by the Engineer – in – Charge for the purpose and the contractor shall at all times, keeps his record upto date and enable the Engineer-in-Charge to apply such checks as he may desire.

(G) Cement which has been unduly long in storage with the contractor or alternatively has deteriorated due to inadequate storage and thus become unfit for use on the works will be rejected by the Department and no claim will be entertained. The Contractor shall forth with remove from the work are any cement the Engineer – in – Charge may disallow for use of work and replace it by cement complying with the relevant Indian Standards

5.2. STEEL

The contractor shall provide mild steel (MS) reinforcement basis, High Yield strength deformed (HYSD) bars, rods and structural steel etc., required for the works only from the main and secondary producers manufacturing steel or other authorized agents to the prescribed specifications. Bureau of Indian Standards requirements and licensed to affixing ISI test certificate issued by the Government approval laboratory certification marks and acceptable to the Engineer – in – Charge. Necessary ISI test certification are to be produced to Engineer – in – Charge before use on works.

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The Diameters and weight of steel should be as follows.

Sl. No.	Diameter of Rod	Sectional weight in kg per running meter both for plain and HYSD Steel.
1	6 Millimeters	-
2	8 Millimeters	-
3	10 Millimeters	-
4	12 Millimeters	0.89
5	14 Millimeters	0.21
6	16 Millimeters	1.58
7	18 Millimeters	2.09
8	20 Millimeters	2.47
9	22 Millimeters	2.98
10	25 Millimeters	3.85
11	28 Millimeters	4.83
12	25 Millimeters	6.35
13	20 Millimeters	4.03
14	32 Millimeters	6.31
15	33 Millimeters	6.71
16	36 Millimeters	7.99
17	40 Millimeters	8.06
18	42 Millimeters	10.88

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

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ADDITIONAL CONDITION

The contractor should use steel centering sheets over sites as to obtain the required finish to the under side of the slab centering steel sheets must be made smooth and perfectly level and to give smooth and even finish to the RCC ceiling centering and form work shall be provided to the and area ordered by the Project Engineer during execution.

ADDITION CONDITION OF CONTRACT - II

The contractor shall at his own expenses provide arrangements for this provision of footwear for any labour during cement mixing work all other similar type of work involving the use of tar mortar etc. to satisfaction of the Engineer – in – charge and no his failure to do so, the Corporation shall be entitled to provide same and recover the cost from the contract.

When there are complaints of non-payment of wages to he labourers bills of the contractor may be with held pending a clearance of certificate from the labour department.

ADDITIONAL CONDITION OF CONTRACT - II

Rules for the provision of health and sanitary arrangements for workers employed by the PWD and his contractors.

The contractor's special attention is invited to clause 37, 38, 39 and 51 of the Tamilnadu Building Practice and he is requested to provide at his own expense the following amenities to the satisfaction of the Project Engineer.

FIRST AID

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

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DRINKING WATER

2. (a) Water of good quality fit for drinking purposes shall be provided for the work people on a scale of not less than three gallon head per day.

(b). Where drinking water is obtained from an intermittent Public Water Supply each work place shall be provided with the storage tanks where such drinking water shall be stored.

(c). Every water supply and storage shall be at a distance not less than 50 feet from any latrine / drain or other existing well which is within such proximity of latrine, drain on any other source of pollution, the well shall be properly closed. If water is drawn from it for drinking. All such wells shall be entirely closed and be provided with a trap door, which shall be dust and waterproof.

(d). A reliable pump shall be fitted to each covered well. The trap door shall be kept locked and opened only for cleaning or inspection which shall be done atleast once in a month.

WASHING AND BATHING PLACES

3. Adequate washing and bathing places shall be provided separately for men and women. Such places shall be kept clear and drained condition. Bathing or washing should not be allowed in or near the drinking water well.

LATRINES AND URINALS

4. There shall be provided within the premises of every work place latrines and urinals in an accessible place and the accommodation separately for each of them shall be on the following scale or on the scale so directed by the Project Engineer in any particular area.
 1. Where the number of persons employed does not exceed 50-3 seats.
 2. Where the number of persons employed exceed 50 but does not exceed 100-3 seats.
 3. For every additional 100 persons 3 seats.

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If women are employed, separate latrines and urinals screened from those for men shall be provided on the same scale. Except in work places provide with water flushed latrine connected with a water borne sewage system, all latrines shall be provided with actable dry earth system which will be cleared atleast four times daily and atleast twice during working hours and kept in a strictly sanitary condition. The latrines and urinals shall be tarred inside and outside atleast once a year.

The escreta from the latrines shall be disposed off at the contractor's expense, in outside pits approved by the local public health authority. The contractor shall also employ adequate number of scavengers, conservancy staff to keep the latrines and urinals in a clean condition.

SHELTER DURING REST

At the work site, there shall be provided at free of cost two suitable sheds one for meals and another for rest separately for men and women for the use of labourers.

CRECHES

2. At every work place at which 50 or more women are working there shall be provided tow huts of suitable size for the use of children under the age of 6 years belonging to such women. One hut shall be used for infants, games and play and the other as their bedroom. The huts shall not be constructed and a lower standard than the following.

- i. Thatched roofs
- ii. Mud floors and walls
- iii. Planks spread over the mud floor and covered with matting

The size of the crech or creches should vary according to the number of women workers. The creches should be properly maintained and necessary equipment like toys etc, should be provided and huts shall be provided with suitable and sufficient sweepers to keep the place clean. There shall be two ayahs in attendance. Sanitary utensils shall be provided to the satisfaction of the health officer of the area concerned.

The number of huts shall be restricted to children and their attendants of the children.

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CANTEEN

3. A cooked food canteen on a moderate scale shall be provided for the benefits of the workers if it is considered expedient.

SHEDS FOR WORKMEN

The contractor should provide at his own expenses shed for housing the workmen. The sheds shall be on a standard not less than the cheap shelter type, to live in which the work pertaining to locality area accustomed to. A floor area of about 1.80 metre X 1.5 metre for 2 persons shall be provided. The sheds to be in rows with 1.3 metres clear work people's camp shall be laid out in units of 400 persons each. Each unit to have clear space of 12 meter around.

ADDITIONAL CONDITION – IV

Safety provision in the building industry conditions in additional to clause 36 preliminary specification of TNBP.

PART – I

ARTICLES – 1

1. Suitable scaffolds shall be provided for workmen for all work that cannot be safely done from ladder or by any other means.
2. A scaffold shall not be constructed, taken down or subsequently altered except,
 - a). Under the supervision of a competent and responsible person and
 - b). by competent workers possessing adequate experience in this kind of work.
3. Scaffolds shall be so constructed that no part thereof can be displaced in consequent of normal use.
4. scaffolds shall not be over loaded so far as practicable and shall be evenly distributed.
5. Before installing lifting gear on scaffolds special precautions shall be taken to ensure the strength and stability of the scaffolds.
6. A competent person shall periodically inspect scaffolds.
7. Before allowing a scaffold to be used by his workmen every employer shall satisfy as to whether the scaffold has been executed by his workmen or not be should taken step to ensure that it functions fully with the requirements of this article.

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ARTICLE – 2

1. Working platform gangways and staircase shall be so constructed that no part thereof can sag unduly or unequally.

a). Be so constructed and maintained to obviate from risks of persons tripping or slipping and

b). be kept free from any unnecessary obstruction.

c). Every working platform gangway working place and staircase shall be suitably forced.

ARTICLE – 3

1. Every opening in the building or in a working platform shall except for the time to the extent required to allow the excess of persons or the transport or shirting of materials be provided with suitable means to prevent the fall of persons or materials.

2. When persons are employed on a roof where there is danger of falling from the height exceed that to be prescribed by national laws of regulations, suitable precautions shall be taken to prevent the fall of persons of materials.

3. Suitable precautions shall be taken to prevent persons being struck by articles which might fall from scaffolds or other working places :

ARTICLE – 4

1. Safe means of access shall be provided, to all working platforms and other working places.

2. Every ladder shall be securely fixed and of such length as to provide secure hand hold and foot held at every position at which it is used.

3. Every place where work is carried on and the means of approach there to shall be adequately lighted.

4. Adequate precautions shall be taken to prevent persons danger from electrical equipment.

5. No materials on the site shall be so attached or placed as to cause danger to any persons.

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PART – II

GENERAL RULES AS TO HOISTING APPLIANCES

ARTICLE – 5

1. Hoisting machines and tackle including their attachments and supports shall.

a) be of good mechanical condition sound material and adequate strength and free from patent defects and

b) be kept in good repair and in good working order.

2. Every rope used in hoisting or lowering materials or as a means of suspension shall be of suitable quality and adequate strength and free from patent defects.

ARTICLE-6

1. Hoisting machines and tackle shall be examined and adequately tested after erection on the site and before use and be reexamined in position at intervals to be prescribed by national law or regulation.

2. Every chain ring, hook shackle, swivel and pulley block used in hoisting or lowering materials or as a means of suspension shall be periodically examined.

ARTICLE – 7

1. Every crane driver or hoisting appliances operator shall be properly qualified.

2. No persons under an age to be prescribed by national law regulations shall be in control of any hoisting machinery including any scaffold which or gives signals to the operator.

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ARTICLE – 8

1. In the case of very hoisting machine and every chain ring hook, shackle swivel and pulley block used in hoisting or lowering or as a means of suspension, the safe working load shall be ascertained by adequate means/
2. Every hoisting machine and all gear referred to in the proceeding paragraphs shall be plainly marked with the safe working load.
3. In the case of hoisting machine having a variable safe working load, each safe working load and the conditions under which it is applicable shall be clearly indicated.
4. No part of any hoisting machine or of any gear referred to in the paragraph (i) of this article shall be loaded beyond the safe working load except for the purpose of testing.

ARTICLE – 9

1. Motor gearing, transmission, electric wiring and other dangerous parts of hoisting appliances shall be provided with sufficient safe guards.
2. Hoisting appliances shall be provided with such means as well reduce the risk of the accident descent of the load.
3. Adequate precautions shall be taken to reduce the risk of any part of suspended load becoming accidentally displaced.

PART – III

GENERAL RULES TO SAFETY EQUIPMENT AND FIRST AID

ARTICLE – 10

1. All necessary personal safety equipment shall be kept available for the use of the persons employed on the site and be maintained in a condition suitable for immediate use.
2. The workers shall be required to use the equipment thus provided and the employer shall take adequate steps to ensure proper use of the equipment by those concerned.

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ARTICLE – 11

When work is carried on in proximity to any place where there is risk of drawing all necessary equipment shall be provided and kept ready for use and all necessary steps shall be taken for the prompt rescue of any person in danger.

ARTICLE – 12

Adequate provision shall be made for prompt first aid treatment of all injuries likely to be sustained during the course of the work.

ARTICLE – 13

Where large work places are situated in cities, towns or in their sub-urban and no beds are considered necessary owing to the proximity of city or town hospital, suitable transport shall be provided to facilitate removal of urgent cases to the Hospitals, at their work places some conveyance facilities such as car shall be kept ready available to the injured person or persons suddenly taken seriously ill to the nearest hospital.

MOSAIC FLOORING

1. Cement concrete flooring tiles shall be manufactured from a mixed cement natural aggregates and colour materials where required by pressure process. During manufacture the tiles shall be subject to a pressure of not less than 140 Kg per sq.m. (or 2000 lbs per sq.m.)
2. Proportion of cement to aggregate in backing of the tiles shall not be less than 1.5 by weight.
3. On removal from mould, the tiles shall be kept in moist condition continuously for at least 7 days and subsequently if necessary kept moist for such a longer period that would ensure their conformity to the requirements of Transfers strength, resistance to wear and tear absorption and would minimize shrinkage and cracking, tiles shall be stored under cover.
4. Tolerance : Tolerance on length and breadth shall be plus or minus one millimeter. Tolerance on thickness shall be plus 5mm that the range of dimensions if any of one delivery of tiles shall not exceed 1mm of length and breadth and 3mm on thickness.

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THICKNESS OF WEARING LAYERS

Class of tiles	Minimum thickness of wearing layer
Plain cement and plain coloured tiles for general duty	3mm
Plain cement and plain coloured tiles for heavy duty	6mm
Plain (mosaic) terrace tiles with chips of size Varying from the smallest upto 6mm (1/4")	5mm
Mosaic terrace tiles with chips of size ranging from the smallest upto 12mm (1/2")	5mm
Mosaic terrace tiles with chips of size varying from the smallest upto 20mm (3/4")	6mm

5. Colours and appearance : The colour and texture of the wearing layer shall be uniform through out its thickness.

6. When specifying the tiles, the contractor should specifically indicate whether the chips to be used are from the smallest units 6mm or from the smallest upto 12mm or from the smallest upto 20mm size. The offers of the department shall also specify size of chips by referring the approximate photograph given in figures upto figures 4 to 6 in Indian Standard 1237 / 1959

GENERAL QUALITY OF TILES

8. Unless otherwise required the wearing face of the terrace tiles shall be mechanically should and flat. The wearing face of the tiles should be plane from projection depressions and crack (Hair cracks not included) and shall be reasonably parallel to the back free of tiles all angle shall be right angels and all edges shall be sharp and true.

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9. Breaking traverse strength of tile shall be given as below

Size of tiles	Span	Breaking wet test	Load based Dry test
19.85 X 19.85cm	15cm	71 Kg	106 Kg
24.85 X 24.85cm	20cm	90 Kg	120 Kg
29.85 X 29.85cm	25cm	99 Kg	149 Kg

10. The average wear of not less than 12 specimens shall not exceed 2mm and wear on any individual specimen shall not exceed 2.5cm when tested in an vibration machine.

11. The average percentage of water absorption shall not be less than six full tiles shall not exceed ten in the case of water absorption test.

12. The density of the tiles shall be in the order of about 2.4 gms. The tiles shall be laid with the minimum possible width of joint and not exceeding 1/32 inch. The joints shall be filled with gray cement to match the finish of the tiles and shall be made almost invisible when the floors is given the final polish. The polishing shall be done by means of electric polisher wherever possible and hand polish to other places like vertical faces or walls covered and other areas where the machines can have no access and to a highly degree so as to present a perfectly smooth and glossy surface as even as possible.

13. All angles at junctions of vertical faces shall be rounded off to 11/2" radius with same quality of materials and colour of the tiles of the floor. But laid in situ and these cover shall be measured as part of flooring and laid for at the same rates as the flat floors. The colours of the tiles shall be match other coloured face adjacent or as may be directed by Project Engineer.

14. The dadoing and skirting have to be finished by giving necessary races in the brick wall itself so that the projections does not exceed 3/4" from the face of the wall i.e. the finish plastered surfaces.

15. Based on the modules of the ruptures of 30 Kg per sq.m. for dry test and two thirds of the value of wet test.

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GUIDE LINES FOR ADOPTION OF STRENGTH GARDENING OF CONCRETE

16. Plain and reinforced concrete have been graded according to the cube compressive strength and designation as M100: M150, M200, M250, M300, M350 and M400. In the designation of concrete the letter "M" refers to the mix and the "Number" to the specified 28 days work cube compressive strength of that mix expressed in Kg. Cm sq.m.

17. Approximately the M100, M150, M200, M250 grades of concrete corresponds to 1:3:6, 1:2:4, 1:11/2:3 and 1:2 nominal mixed of ordinary concrete currently used. The national building code gives necessary specification for strength gardening of concrete, proportionately and works control and the same may be followed the extract of the same is enclosed.

18. The proportion of aggregates, cement and water to be used for controlled concrete shall be designed by preliminary tests of the materials to be actually used to obtain the specified strength with the maximum quantity of cements. However, the maximum total quantity of aggregate by weight per 50 Kg of cement shall not normally exceed 450 Kg.

19. For any particular item compressive strength required to be obtained by the concrete at 28 days in the preliminary and work test on the 15cm cubes minimum cement content, required to be used and the approximate proportions approved fine and coarse aggregate shall be specified, in the tender schedule. These particulars will be only for the guidance of the contractor for quoting rates.

20. Immediately upon the receipt of the award of contract, the contractor shall inform the Project Engineer the exact location of the sources of the materials which he propose to use and get the materials approved. The mix with the actual approved materials to be used shall be got designed in an approved laboratory by the contractor with minimum quantity of cement to give the specified strength in the preliminary tests and the proportions shall be used so long as the materials continue to be of the same quality and the same sources subject only to slight changes in the relative qualities is of fine and coarse aggregate for the purpose of promoting 3ork ability provided the work tests also show the required strength.

21. If during the progress of work, the contractor wishes to change the materials the proportion shall be fixed on the basis of the fresh preliminary tests to give the required strength after the Project Engineer is satisfied that the materials satisfy the specification. No adjustment of cost shall be made for change of proportions of cement fixed in the original preliminary tests.

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PROPORTIONING OF MIX

Each batch of mix shall be proportioned by weight of cement fine aggregate and coarse aggregate, water for each bag shall be added in quantity measured by volumes or by weight. Where weight of cement determined by accepting the maker weight per bag, a reasonable number of bag shall be weighted separately to check the nett weight, and the cement is weighted weight per bag, a reasonable number of bags shall be weighed on the site and not in bags. It shall be weighted separately from the aggregate. In the weighting equipment's shall be maintained in a clean and serviceable condition and their accuracy checked periodically.

MIXING

Mixing shall be done by mechanical mixes. The quantities of fine aggregate and water shall be adjusted duly in the filed to compensate for bulkage due to the quantity of moisture present in fire aggregate and free water in the coarse aggregate at the time of use.

TESTS

Tests shall be got done in an approved laboratory at the cost of the contractor.

PRELIMINARY TEST

If concrete mixes are specified by its strength then the mix needs be designed and preliminary test should be carried out.

Preliminary test is conducted in a laboratory on the trial mix of concrete produced in the laboratory with the object of :

- a). Designing a concrete mix before the actual concrete operation starts.
- b). Determining the adjustments requirement in the designed mix when there is a change in the materials used during the execution of works or.
- c). Verifying the strength of cement mix.

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B. WORK TESTS

The test shall be conducted either in the field or in a laboratory on the sample made in the work spot of the concrete used on the work.

The samples shall be spread as evenly as possible throughout the day then wide changes of weather conditions occur during concrete additional sample may be taken as desired by the Project Engineer.

All expenses on the tests shall be borne by the contractor. Nothing extra shall be paid to the contractor for carrying out the tests.

All samples or tests shall be taken in the presence of the Assistant Engineer concerned and the contractor or his authorized agent.

All mix design and test date and results shall be maintained as part of the record for the contract and shall be signed by the Assistant Executive Engineer and the contractor.

A register of cement concrete cubes cast and tested giving the following particulars shall be maintained at the site :

1. Name of work and reference to Agreement
2. Serial Number
3. Date and time of sample taken
4. Sample Number
5. Number of cubs
6. Identification marks
7. Proportions of mix
8. Description of the portion of work represented by the sample and quantity of concrete represented by the sample
9. Initial of Assistant Executive Engineer and the contractor's authorized agent in whose presence the sample is taken.
10. Result of 7 days test.
11. Result of 28 days test.
12. Review and remarks by Project Engineer.

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EXTRACT OF :

NATIONAL BUILDINGS CODE OF INDIA, 1970

Part VI Section 5A : PLAIN AND REINFORCED CONCRETE

4.2 Grades of concrete.

4.2.1. Plain and reinforced concrete shall be in seven grades as designated as M100, M150, M200, M250, M300, M350 and M400.

Note ; In the designated of a concrete mix, letter "M" refers to the mix and the number of specified 28 days work cube compressive strength of that mix expressed in Kg/sq.m.

4.2.2.1. Where ordinary Portland cement or Portland blast furnace slag cement conforming to accepted standard VI 5 (2)* is used. The compressive strength requirements for various grades of concrete shall be as given in Table.1. Where requirements specified in Table.1. shall be met at 7 days. Where other cements are used, the Engineer – in – Charge shall specify the corresponding requirements preferably on the basis of preliminary tests.

* IS 269 / 1967 specification for ordinary rapid hardening and low heat Portland cement.

IS 455 / 1967 specification for Portland and blast furnace slag cement.

4.2.2.2. The strength requirements specified in Table.1. shall apply to both controlled concrete and ordinary concrete (see 4.31) preliminary tests need not however, be made in the case of ordinary concrete:

a. In order to get a relatively quicker idea of the quality of concrete, optional works tests on beams for modulus of rupture at 72 + or – 3 hours / at 7 days, compressive strength tests at 7 days may be carried out in addition to 28 days compressive strength test. In all cases, the 28 days compressive strength specified in Table.1. shall alone be the criterion for acceptance or rejection of the concrete. If however form tests carried out in a particular job over a reasonably long period, it has been established to the satisfaction of engineer – in – Charge that a suitable ratio between the 28 days strength and the modulus of rupture at 72 + or – 2 hours at 7 days of compressive strength at 7 days may be accepted. The Engineer-in-Charge may suitably relax the frequency of 28 days compressive strength test specified in Table.5. provided the expected strength values at the specified early age are consistently met. For this purpose the values given in Table.2. may be taken for general guidance in the case of concrete with ordinary cement.

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b. Whether the strength of a concrete mix, as indicated by test lies between the strength for any two grades, specified in Table.1. such concrete shall be classified for all purpose as a concrete belonging to the lower of the two grade between which its strength lies.

4.3. Proportioning and works control :

4.3.1. Methods of proportioning : The determination of the proportion of cement aggregate and water to attain the required strength shall be made by one of the following.

a). With preliminary tests by adopting nominal concrete mixes. Such concrete shall be ordinary concrete.

4.3.2. Controlled Concrete :

4.3.2.1. As far as practicable, controlled concrete should be used on all concrete works. Controlled concrete for use in plain an reinforced concrete structures shall be in grade M100, M150, M200, M250, M300, M350 and M400.

4.3.2.2. The concrete mix shall be designated to have an average strength corresponding to the value specified for preliminary test in table.1. The proportions chosen should be given such that the concrete is of adequate workability for the conditions prevailing on the work in question and may properly compacted with the means available.

The maximum total quantity of aggregate by weight per 50 Kg of cement shall not exceed 450 Kg. Except where otherwise specifically permitted by the Engineer – in – Charge.

4.3.2.3. Except where it can be shown to the satisfaction of the Engineer-in-Charge that supply of proper graded aggregate of Uniform quantity may be maintained over the period of work, the grading of aggregate should be controlled by obtaining the course aggregate in different sizes being stocked in separate stock file. The materials should be stock piled for several hours preferably a day before use. The grading of coarse and fine aggregate should be checked as frequently as possible the frequency for a given job being determined by the Engineer – in – Charge to ensure that the suppliers are maintaining the grading uniform with that on the samples use in the preliminary tests.

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4.3.2.4. In proportioning concrete the quantity of both cement and aggregate should be determined by weight. Where the weight of cement is determined by accepting the manufactures weight per bag and reasonable number of bags should be weighed separately to check the net weight where the cement is weighed on the site and not in bags it should be weighed separately from the aggregates. Water should be either measured by volumes in calibrated tanks or weighed. All measuring conditions and their accuracy may be periodically checked.

4.3.2.5. It is most important to maintain the water cement ratio constant at its correct value. To this end, determination of moisture contents in both fine and coarse aggregates should be made as frequently as possible the frequency for given job being determined by the Engineer – in – Charge according to weather conditions. The amount of the added water should be adjusted to Compensate for any observed variations in the moisture contents. The determination of moisture content in the aggregate shall be carried out in accordance with good practice (VI-05-9) IS 2386 Part III – 1963. To allow for the variation in the weight of aggregates due to variation in their moisture content suitable adjustment in the weight of aggregate should also be made.

4.3.2.6. No substitution in materials used on the work or alternation in the established proportions except as permitted in 4.3.2. Shall be made without additional tests to show that the quality and strength for this purpose.

4.3.2.7. Workability of the concrete should be checked at frequent intervals. To slump test or where facilities with the compacting factor test conducted in accordance with good practice VI 5 (10) may adopted for this purpose.

4.3.2.8. A competent persons should be employed where first duty will be supervision all stage in the preparation and placing of the concrete. All work test specimen should be made and site tests carried out with his direct supervision.

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4.3.3. Ordinary Concrete :

4.3.3.1. Where it is considered not practicable to use controlled concrete, ordinary concrete may be used for concrete of grades M100, M150, M200, M250. The proportions of materials for nominal concrete mixes for ordinary concrete shall be in accordance with table.3.

4.3.3.2. In purporting concrete the quantity of cement should be determined by weight. The quantities of fine and coarse aggregates may be determined by volume but these should also preferably be determined from the volume specified in table.3. and the weight per litre of dry aggregate. If fine aggregate is moist and volume batching is adopted, allowances shall be made for bulking in accordance with good practice (VI.5 (9)*)

4.3.3.3. The water cement ratio shall not be more than the specified in table.3. The cement content of the mix specified in the table.3. any nominal mix may be increased if the quantity of water in a mix has to be increased to overcome to the difficulties of placement and compaction so that the water cement ratio specified in Table.3. is not exceeded.

Note.1 : In case of vibrated concrete, the limit specified may be suitably reduced to avoid aggregation.

Note.2 : The quantity of water used in the concrete mix for reinforced concrete work should be sufficient, but should not be more than what is sufficient to, produce a dense concrete of adequate workability for the purpose, which will surround the properly grip, all the reinforcements, work ability of the concrete should be controlled by maintaining water cement ratio that is found to give a concrete which is just sufficiently wet to be placed and compacted without difficulty with the means available.

4.3.3.4. Workability of concrete should be controlled by direct measurement of water content, making allowance for any surface water in the fine and coarse aggregates. The slump test may be conducted in accordance with good practice (VI.5 (10)).

4.3.3.5. Allowance should be made for surface water present in the aggregate when computing the water cement surfaces water shall be determined by field methods in accordance with good practice VI.5 (9). In the absence of exact data the amount of surface water may be estimated from the values given in the Table.4.

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4.3.3.6. If ordinary concrete made in accordance with the proportions given for a particular grade does not yield the specified due to proper qualities of materials not being available, such concrete shall be classified as belonging to the appropriate lower grade.

Ordinary concrete proportioned for a grade given in accordance with table.3. shall not however be placed in a higher grade on the ground that the test strengths are higher than the minimum specified. No interpolation shall be permissible.

4.4. Sample size and acceptance criteria

4.4.1. All tests shall be carried out in accordance with good practice (VI-5 (4)).

4.4.2. The number of test specimens required, the frequency of sampling and the criteria for acceptance of a concrete as conforming to the specified grade shall being accordance with table.5. for both ordinary concrete and controlled concrete. No preliminary test are, however, necessary in the case of ordinary concrete.

* ISI 199 – 1959 – Methods of sampling, and analysis of concrete.

* IS 2386 (Part III 1963) specific gravity, density, voids absorption and bulking – methods of tests for aggregation for concrete.

* IS 223866 – Methods of test for aggregates for concrete. IS (Part III) 1963-Specific gravity density voids absorption and bulking.

* IS 516 – 1959 – Method of tests for strength of concrete.

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TABLE.1.
STRENGTH REQUIREMENTS OF CONCRETE

(CLAUSE 4.2.2.1 AND 4.2.2.2.)

(All values in Kgs / Cm. Sq.)

Grade of compressive strength of 15cm cubes at 28 days after mixing concrete conducted in accordance with good practice VI.5 (4). *

1.	Preliminary tests min. 2	Work test Min 3.
M100	135	100
M150	200	150
M200	260	200
M250	320	250
M300	380	300
M350	440	350
M400	500	400

Note 1 : Preliminary Test : A test is conducted in a laboratory on the trail mix of concrete produced in the laboratory with the object of

a). Designing the adjustments required in the designed mix when there is a change in the materials used during the execution of work, or

b). Determining the adjustment required in the designed mix when there is a change in the materials used during the execution of work, or

c). Verifying the strength of concrete mix

Note 2 : Work Test : A test conducted either in the field or in laboratory on the specimens made on the works out of the concrete being used on the works.

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Note 3 : Size of cubes : In the working test, with the approval of the Engineer-in-Charge 10cm cubes may be used in place of 15cm cubes provided the maximum nominal size of aggregate does not exceed 20mm. Even the use of 15cm cubes should normally be restricted to concrete's having a maximum nominal size of aggregate not exceeding 40mm. Where concrete with aggregates larger than 40mm size is required to be tested, the size of cubes should be specified by the Engineer-in-charge, keeping in view that generally the length of side of the cube should be about four times the maximum nominal size of aggregate in the concrete constituting the cube specimen.

* IS 5-16 – 1959 – Methods of test for strength of concrete

Note 5 : Cylinder strength – Compressive strength test may, with the approval of the Engineer-in-charge, be conducted on 15cm, diameter and 30cm high cylinder in accordance with good. Practice (VIU.5 (4))* instead of one cube, where cylinder strength figures are adopted the compressive strength figures given above shall be modified according to the formula. Minimum cylinder compressive strength required 0.8. compressive strength specified for 15cm cubes.

THE CENTRAL ROAD RESEARCH INSTITUTE, New Delhi has carried out test with a view to establishing a relation between water cement ratio and the compressive strength of concrete using ordinary Portland cement manufactured in the country to accepted Standards (VI-5 (2)).

As a result of these, it has been considered advisable to give graphs showing the relationship between the compressive strength of Concrete mixes with different water cement ratios and the 7 days compressive strength of concrete tested in accordance with good practice (VI – 5 – (2)). These graphs have been given in Appendix – A. As they would be some assistance in obtaining the water cement ratio for trial mix of concrete.

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TABLE.2.

OPTIONAL WORKS TEST REQUIREMENTS OF CONCRETE

(Clause 4.2.2.2 (a))

(All values in Kg/cm.sq.)

All test shall be conducted in accordance with good practice (VI-5-(4)*).

Grade of Concrete 1.	Compressive strength of 15cm cubes min 7 days 2.	Modules scripture by beams test in	
		At 7.2 + or -2 Hours 3.	At 7.2 + or -2 Hours 4.
M100	70	12	17
M150	100	15	21
M200	135	17	24
M250	170	19	27
M300	200	22	30
M350	235	23	32
M400	270	25	34

Note : Notes 3 to 5 under Table.1. are also applicable to this table.

* L.S. 510-1959 Methods of test for strength of concrete

* L.S. 261-1967 Specification for ordinary rapid hardening and best Portland cement

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TABLE.3.
CONCRETE MIX PROPORTIONS
(CLAUSE 4.3.3.)
ORDINARY CONCRETE

Grade of concrete 1.	Total quantity of dry aggregates by volume per 50 Kg of cement to be taken as the sum of the individual volumes of fine and coarse aggregate max. 2.	Proportion of fine aggregate to coarse aggregate 3.	Quantity of water per 50 Kgs. Of cement Max. 4.
M100	300 Liters.	--	34 Liters.
M150	220 Liters.	--	32 Liters
M200	160 Liters.	--	30 Liters
M250	100 Liters.	--	27 Liters

Note : It may be noted for general guidance that M100, M150, M200 and M250 or ordinary concrete correspond approximately to 1:3:6, 1:2:4, 1:11/2:3 and 1:1:2 nominal mixes of ordinary concrete currently used in the country.

The preparations of the aggregate should be adjusted from upper limit to lower limit progressively as the grading of the fine aggregate becomes finer and the maximum size of coarse aggregate becomes larger. Example, for an average grading of fine aggregate i.e. Zone II in accordance with good practice (VI-5-(1)) the proportion shall be 1:11/2, 1:2 and 1:3 for maximum size of aggregate 10mm, 20mm and 30mm respectively.

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TABLE.4.

SURFACE WATER CARRIED BY AVERAGE AGGREGATE

Aggregate 1.	Appr. Quantity of surface water 1/m³ 2.
Very wet sand	120
Moderate wet sand	80
Moist Sand	40
Moist gravel or crushed work / 20 to 40	40

- Course aggregate, less the water it will carry
- I.S. 383 - 1963 - specification for coarse and fine aggregate for natural coarse
- I.S. 516 - 1959 - Specification for nominal and manufactured aggregate for use in mass concrete.

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TABLE.5.

ACCEPTANCE CRITERIA FOR CONCRETE (ALL GRADES)

Preliminary Test				Work test						
Minimum No. of specimens from each batch (cubes)		Minimum frequency	Criteria for acceptance	Minimum No. of specimen taken from the same day's Works				Minimum frequency		Criteria of acceptance
				(Cubes)		(Beam)				
7 days compressive strength test as on optional test if desired	28 days compressive strength test			7 days compressive strength test as on optional test if desired	28 days compressive strength test	72 + or - 2 hours test as on optional test, if desired	7 test as an optional test, if desired	In terms of period	In terms of period	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.

For each batch with a minimum of three batches	
Accept if average compressive strength of the specimens tested is not less than the compressive strength specified in Table 1. (For optional tests, see Table 2.) subject to the conditional that only one out of five consecutive tests may give a value less than specified strength	
For every 150 cubic meter of concrete of part there of	
At such intervals as the Engineer – in – charge may direct however, in the case of controlled concrete, samples shall be drawn on each day for the first 4 days of concreting and thereafter at least once in 7 days of concreting	
Accept if average strength of the specimens tested is not less than the strength specified in table 1. (for optional tests see table 2.) subject to the condition that only one out of 3 consecutive tests may give a value less than the specified strength but this shall not be less than 90% of specified strength	

	10								
		For each batch with a minimum of three batches							
		Accept if average compressive strength of the specimens tested is not less than the compressive strength specified in Table.1. subject to the condition that the average compressive strength in Table.1. by at least the value of Standard deviation * of the series of test.							
		For every 150 cubic meter of concrete of part there of							
		At such intervals as the Engineer – in – charge may diced however, in the case of controlled concrete, samples shall be drawn on each day for the first 4 days of concreting and there after atleast once in 7 days of concreting							
		Accept of average strength of the specimens tested is not less than the strength specified in table.1. (for optional tests see table.2.) subject to the condition that only one out of 5 consecutive tests may give a value less than the specified strength.							

* Standard

$$\frac{M}{n} = \frac{\sum d^2}{n^3}$$

Where d = individual deviation form one average, and
n = number of specimens tested.

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SPECIFICATION FOR SANITARY FITTING SD DRAINAGE AND WATER SUPPLY

1. Water closets basins urinals sinks and other sanitary were shall be of approved make as required in the relevant items fixing of these shall be in accordance with the special specification.
2. The rates shall include the dismantling making holes in walls or slabs and restoring the structure to the original conditions after the completion of the work.
3. The work should be carried out with least hindrance to the adjoining building and the contractor shall be responsible for any damage caused to the existing fixture, electric fittings etc. in the course of execution and the contractor shall make good any such damage without claim for extra.
4. The rate for laying stone were pipes shall include necessary all incidental charges during execution of work and making good the damage to the roads and other structures.
5. The rates for laying G.I. pipes or PVC pipes shall include fixing with wooden plus G.I / C.I. clamps and brass screws where the pipes area fixed to wall. The rates for G.I. pipes shall also include wrapping them with tarred taps where they are buried in earth the portions embedded in masonry and painting with white lead two coats for portions above ground level.
6. The clamps for G.I. pipes fitting should not be spaced more than a part the wooden plugs for pipe and bracket fitting should be properly fixed in C.M. 1:3 in holder make in masonry with the wide and of wedge shaped plugs in side the walls. The size of plugs should not be less than 1 sq.m. inch at one end, ½ sq.m inch at the other end with depth of not less than 3".
7. Painting with two coats of best white paint or any other colour approved by the Project Engineer over priming cot of red lead to all flushing tanks brackets claps used for fixing pipes and all other connection.
8. The contractor should employ sufficient number of qualified licensed plumber with necessary experience and skill in the trade to the satisfaction of the Project Engineer concerned for execution of water supply and sanitary items of work.

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9. The rate shall include all dismantling making holes in walls or slabs and testing the structure to the original condition after the completion of the work.
1. The water for works shall be as far as practicable free from earthling vegetable or organic matter and from salts or other substance likely to interface with the setting of mortar of otherwise prove harmful to the work
2. All items of work shall be done in accordance with the relevant classes of TNBP and agenda volume to the TNBP or amendments from time to time.
3. The contractor shall be responsible for the safe custody of all the departmental materials once they are handed over to the contractor at the departmental materials once they are handed over to the contractor at the departmental stores. The cost of any materials in the custody of the contractor stolen, lost, destroyed or damaged or if rendered unfit for the work will be recovered from the contractor at the issue rate.
4. For testing the concrete and aggregate the contractor must procure the following equipments and make them available at site.
 1. Steel mould for making 45cm cube of concrete (The mould will be in two halves for easy removal)
 2. Slumps cone for testing consistency (slump test) the cone will be 30cm height truss casted cone with top and bottom diameters of 10 cm and 20cm respectively. In addition a steel rod 15cm dia and 50cm in length and with tamping and rounded is to be procured.
 3. For finding fineness modules and coarse aggregate hand operated over a apparatus may be procured along with weighing machine for weighing the aggregate and the sand.
 4. In the case of any breach of the terms of the contract the contract will be closed at the risk and the cost of contractor in addition to the forfeiture of the EMD and security deposit.
 5. The testing is to be done at the contractor's cost for all building materials and also for concrete cubes.

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6. The work shall be executed and measured as per metric dimension given in the schedule of quantities drawing etc. (F.P. units where indicated are for guidance only)
7. Unless otherwise specified all the rates quoted by the contractor shall be for works at all levels of the buildings.
8. Rates for every item of work to be done under this contract shall be for all lifts and leads, heights, depths, lengths and widths
Except when specifically mentioned in the item, otherwise nothing extra will be paid on this account
The rate for all item in which use of cement is involved is inclusive of charges for curing.

SUPPLYING AND FIXING INDIAN TYPE WATER CLOSET

1. The Indian type Water Closet shall be fixed in position at floor level in a bed of concrete brick jelly in lime mortar 1:2 so as to complete by embedding the closet trap and foot rests. The existing masonry structure after dismantling the floor, making the holes etc. shall be restored to its original condition after completion of work. The foot rests should be fixed at an angle as per Standard.
2. The PVC flushing tank shall be of three gallons capacity of Indian make conforming to ISI specification supported on C.I. Brackets with necessary C.I. chain and handle for pull float hell valve ½" PVC connections to the water main and closet including pier the white glazed paint 2 coats over a priming coat of red lead.
3. The fixing of water closet shall include the dismantling of existing floor however indicated making holes in necessary walls etc. and restoring structure to original condition after completion of the work. The flushing tank and accessories will be fixed to the walls with necessary clamps and brackets in C.M. 1:4.

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ADDITIONAL CONDITION FOR CONTRACTOR'S SPECIAL ATTENTION

1. If at any time the Project Engineer shall be of the opinion that the contractor is delaying commencement of the work or violating any of the progress of the site work as defined by the tabular statement rate of progress in the article of agreement, the Project Engineer shall so advise the contractor in writing and at the same time demand complied. If the contractor neglects to comply with such demand within seven days after the receipt of such notice it shall these or at any time thereafter be lawful for the Project Engineer to determine the contract which determination shall carry with the forfeiture of the security deposit and the total of the amount withheld from the final bill together with value of such works as may have been executed and not paid for such proportion of such total sums as shall be assessed by the Project Engineer.

ADDITIONAL CONDITIONS

1. Water and lighting : The contractor shall pay all fees and provide water and light as required from Municipal main or other sources and shall pay all charges therefore (including storage tanks, metre etc.) for the use of the works and workman unless otherwise arranged and decided as in writing with Project Engineer.

The tenderer shall ensure that no damage is caused to the exiting structure / building whether it is Corporation owned or private owned etc. in the adjustment areas close preliminary to the proposed site and if any damage is caused doe to pipe driving etc. to the adjacent buildings it shall be rectified / compensated by the tenderer at his own cost of the satisfaction of departmental officers / owners of any private building affected (i.e) the contractor should indemnify the department against damages if any to adjacent building due to the driving.

The contractor has to make his own arrangements for procuring water for construction purpose construction and curing should be done with water free from injurious amounts of deletion materials portable water are generally considered satisfactory for curing and fixing concrete and masonry. However the water to be used should be periodically tested at contractors cost for its suitability for using the construction work and got approved from Department Engineers.

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Electricity : The contractor should make his own arrangements for obtaining electricity for all types of his use like lighting, welding, pumping and mosaic and marble polishing etc.

Any damages to work resulting from rains or from any other cause until these works are taken over by the department after completion will be made good by the contractor at his own cost.

ADDITIONAL CONDITIONS

"On evaluation of tender if it is found that if the overall quoted amount of the tender is less than 5 to 15% of the value put to tender, the contractor shall pay an additional security at 2% of the estimated value. If the tender discount exceeds 15% to 20%, the contractor shall pay an additional security deposit of 50% of the difference between the quoted amount and estimated amount. Failure to furnish the additional security deposit within 15 days from the date of receipt of Acceptance order and execute the Agreement shall entail cancellation of award of contract and forfeiture of E.M.D. furnished."

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